Handbooks of the Flora and Fauna of South Australia, issued by the British Science Guild (South Australian Branch) and published by favour of the Honourable the Premier (Hon. R. L. Butler, M.P.)

TOADSTOOLS AND MUSHROOMS

AND OTHER

Larger Fungi of South Australia.

By JOHN BURTON CLELAND, M.D.

Part II.

CONTAINING

Polypores, Coral Fungi and remaining Hymenomycetes

AND THE

Puff-balls, Jelly-like Fungi, the Larger Ascomycetes and the Myxomycetes.

WITH ILLUSTRATIONS.

PRICE: FIVE SHILLINGS

ADELAIDE:
PRINTED BY FRANK TRIGG, GOVERNMENT PRINTER, NORTH TERRACE.

JUNE, 1935.

HANDBOOKS ISSUED.

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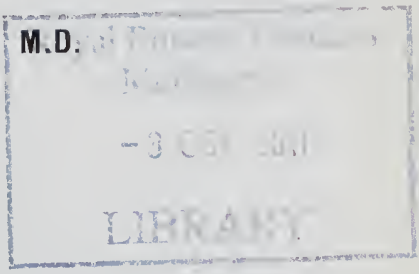

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Wholly set up and printed in Australia by
FRANK TRIGG, Government Printer, Adelaide.
Registered at the General Post Office, Adelaide, for transmission through the post as a book.

June, 1935.

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[*Watercolour by Miss P. Clarke.*

PLATE VII.

Sclerotium of *Polyporus mylittae* **Cke. et Massee (No 315). From the cut Surface abortive Fruiting Bodies, each with Pileus and Stem, have developed. New South Wales.**

EDITORIAL PREFACE.

Handbooks of the Flora and Fauna of South Australia, issued by the British Science Guild (South Australian Branch).

Reeognising the need for a wider diffusion of aeeurate knowledge of our Flora and Fauna, the Guild has undertaken the issue of a series of handbooks.

There is an admitted laek of inexpensive but aeeurate books dealing with the plants and animals of South Australia, and it is felt that the absenee of such has been a real handieap to young Australia, and so to the progress of Australian Seienee. These volumes, which have been planned to meet the want, are being prepared gratuitously by South Australian biologists and geologists ; they will be printed and published by the State Government, and will be available for sehools and the publie generally.

INTRODUCTION TO PART II.

The First Part of the Handbook on the Toadstools and Mushrooms and other Larger Fungi of South Australia contained a systematic account of the gill-forming, mostly fleshy, fungi included in the Agaricaceae belonging to the Basidiomycetales. The Second Part deals in sequence with the remaining fungi included in the scope of this work and completes the Handbook. The description of the Basidiomycetales is continued, dealing firstly with the pore-forming fungi (the *Polyporaceae*) which comprise the fleshy putrescent stalked *Boleti*, resembling the agarics but with the spore-bearing surface in the form of tubes instead of gills, and the firmer, non-putrescent, leathery, corky or even woody, sometimes perennial, polypores of such genera as *Fomes*, *Polyporus* and *Trametes*.

Some of the *Boleti*, such as *Boletus luteus* and *B. granulatus*, are edible. These two species are also of interest as they only occur under or near species of *Pinus*, and, by means of their mycelial strands, may perhaps be found to have an association with the rootlets of the trees or seedlings which may be of advantage to the latter. Certain of the *Boleti*, when cut across, show a rapid change of colour on the exposed surface, from white or pallid to blue, green, reddish, yellow or dingy brown, due to the injury setting free ferments which cause rapid oxidation with the formation of coloured compounds. Bruising also may give rise to these changes. Some *Boleti* are highly coloured, and the colouring is often of a lurid type, suggesting, one hardly knows why, that the fungus in question is poisonous, *Boletus Satanas* of Europe perhaps getting its name in this way. The stem in some instances is reticulated with lines which may be red or the reticulations may be raised presenting a lacunose appearance.

The species of *Fomes* are perennial, often large, hard and woody, hoof-shaped or plate-like bracket fungi growing on the bases of trees or on dead stumps and logs. Some are responsible for heart-rots of living trees, causing loss in forestry operations. Being perennial, they may be responsible each year after autumnal rains for distributing millions of spores, an occasional one of which may lodge in a suitable position to grow, as where a branch has recently broken off.

Ganoderma is characterised by a laccate crust and brown truncate spores. The species may be sessile or stalked. *G. applanatum* may form very large plate-like brackets.

In the genus *Polyporus*, some species have a stem and cap and others form merely lateral brackets. We have several interesting stalked species which possess large underground true or false sclerotia, sometimes as large as a child's head and pounds in weight, from which after autumn rains the fruiting body emerges. The so-called "native bread" (there seems doubt as to whether the natives could have eaten this tough material) is such an underground store-house, from which arises a white stem and pileus, the latter with egg-yolk coloured patches on it, the fungus being called *Polyporus mylittae*. The "stone-making fungus," *P. basilapiloides*, of our mallee areas, has a similar sclerotium and a pale-brownish cap with reticulations on it. Punk, the bracket of *P. eucalyptorum*, grows high up on several species of Eucalypts, the pore-bearing surface being a beautiful lemon-yellow when fresh. The stalked species are commoner on the ground, often growing from buried fragments of wood, and the bracket forms on fallen or upright trunks.

The species of *Polystictus* are thin, pliant and leathery-firm, and often elegant in colour and shape, some being stalked and others forming brackets. *P. versicolor* with bands of grey and brown is very common. In *Trametes*, the tubes are set at varying depths in the substance of the bracket. The vermilion-coloured *T. cinnabarina* is very common on dead wood. The small hoof-shaped *T. ochroleuca*, with ochraceous tints, is common on fence posts and rails. *T. lilacino-gilva*, of a beautiful lilac colour on the under-surface, brownish with a lilac tinge on the upper-surface, is also common and has been responsible apparently for decay in sleepers in some of our mallee districts.

In the genus *Poria*, the pore-bearing surface is spread out on the substratum, usually wood. We have a number of species, some of which play a part in the destruction of timber.

In *Merulius*, the pores assume the appearance of anastomosing wrinkles. The notorious *Merulius lacrymans*, so called from exuding drops of moisture, forming sheets of a yellow ferruginous colour, has been found in this State; it is very destructive to worked wood in buildings to which moisture has had access.

Fistulina hepatica, the "vegetable beef-steak," an edible species but tough, and somewhat resembling on section a piece of steak, has been found on logs at Mount Lofty.

In the *Hydnaceae*, the hymenium or spore-bearing surface, instead of covering gills, as in the Agaricaceae, or lining tubes, as in the Polyporaceae, covers the surface of spines or nodular elevations which may themselves be further divided into processes. In *Hydnum* the pileus may be stalked, bearing spines on the under surface, and the fruiting body may be fleshy but is usually firm and coriaceous. *Hydnum repandum* is a fleshy, buff-coloured species which is edible. Most of the species in the various other genera are more or less effused and crustaceous, the surface being covered with spines, warts, or tubercles. Some play a part in the disintegration of timber.

In the *Thelephoraceae* the hymenial surface is smooth or at the most rugose or ribbed and does not cover gills, line tubes, or extend over spines or tubercles. The plants are mostly thin, dry, coriaceous or membranaceous, and in most cases reflexed or effused and encrusting. Some species of *Stereum*, such as *S. elegans* found near trees in the National Park, are stalked but our other species of this genus are reflexed. *Stereum hirsutum*, with the hymenial surface warm buff, is very common especially on dead stumps. In *Corticium* and its allies, the receptacles are effused over the woody substratum on which the plant is growing and in some cases when coloured may suggest a splash of paint. We have a considerable number of species but so far only a few have been identified.

In the *Clavariaceae*, the receptacles are coral-like or club-shaped and mostly fleshy. The clubs may be simple or more or less branched or antler-like, or the whole plant from a fleshy base may branch repeatedly like a piece of coral or may even resemble a cauliflower.

A short general account of the Gasteromycetales, of the Auriculariales, Tremellales, Tulasnellalles, and Calocerales, of some of the larger Ascomycetes and of the Myxomycetes will be found preceding the respective systematic descriptions.

Classification of Families and Genera.

HYMENOMYCETALES—continued.

POLYPORACEAE.

I. Hymenium soft, separable from the pileus, at first covered by a veil, becoming fully exposed at maturity. (Tribe BOLETEAE.)

Tubes regular.
- Pileus more or less smooth.
  - Large.
    - Spores white or pale yellowish .. *Gyroporus.*
    - Spores pink .. *Tylopilus.*
    - Spores purple .. *Phaeoporus.*
    - Spores ochraceous, ferruginous or olivaceous.
      - Tubes long .. *Boletus.*
  - Very small and tender .. *Filoboletus.*
- Pileus floccose scaly.
  - Spores ochraceous. Tubes short, alveolar, decurrent .. *Boletinus.*
- Pileus covered with imbricate scales .. *Strobilomyces.*

Tubes gyrose-plicate, very short .. *Gyrodon.*

II. Hymenium exposed from the first, lining coherent tubes, sometimes toothed, or anastomosing plates. (Tribe POLYPOREAE.)

Receptacle pileate, not gelatinous.
- Tubes entire.
  - Tubes usually in strata.
    - Receptacle hard, woody or corky. Spores white or coloured .. *Fomes.*
    - Receptacle stipitate or sessile, with a more or less laccate crust. Spores coloured, truncate at base *Ganoderma.*
  - Tubes not in strata.
    - Tubes at proximal ends even.
      - Fleshy firm, relatively thick. Tubes forming a layer distinct from the substance of the pileus .. *Polyporus.*
      - Leathery, thin. Tubes homogeneous with the substance of the pileus, not forming a distinct layer .. *Polystictus.*
    - Tubes at proximal ends sunk different depths into the context.
      - Tubes rounded .. *Trametes.*
      - Tubes wide, more or less hexagonal .. *Hexagona.*
- Tubes torn into teeth.
  - Tubes alveolar, becoming torn or toothed, leathery or leathery membranaceous .. *Irpex.*
  - Similar but substance woody .. *Echinodontium.*
  - Tubes becoming torn into teeth or gill-like plates anastomosing at the base, fleshy or membranaceous fleshy .. *Sistotrema.*
- Tube-like spaces formed of lamellae which anastomose.
  - Tubes labyrinthiform, irregular or sinuous .. *Daedalea.*
  - Lamellae radially arranged .. *Lenzites.*
  - Lamellae concentrically arranged .. *Cyclomyces.*
  - Lamellae vein-like, anastomosing, radial .. *Favolus.*
  - Like *Favolus* but with thick setae .. *Elmerina.*
  - Lamellae very small, thin, forked, parallel, line-like . *Hymenogramme.*

Receptacle resupinate, not gelatinous.
- Tubes simple .. *Poria.*

Hymenium or the whole receptacle gelatinous, mostly small.
- Pores more or less honey-combed.
  - Receptacle leathery. Hymenium gelatinous .. *Gloeoporus.*
  - Receptacle uniformly gelatinous .. *Laschia.*

II. Hymenium seated directly on the mycelium.

Receptacle resupinate, waxy or floccose. Hymenium smooth with scattered protuberances caused by the breaking through of fasciculate sterile mycelial hyphae. Spores white. Cystidia none .. .. *Epithele.*

Receptacle saucer-shaped with a free margin, or resupinate and adnate, floccose or crustaceous becoming coriaceous. Hymenium smooth, pulverulent with much granular or crystalline matter. Spores white, large; basidia large, sterile basidia or paraphyses moniliform or racemose .. *Aleurodiscus.*

Receptacle effused, crumbly, floccose, thin-membranaceous or almost waxy. Hymenium formed of sparsely distributed basidia in a felt-work of dichotomous-branching ramifying paraphyses (dichophyses), colourless or poorly stained with pointed ends, basidia club-shaped with 2-4 sterigmata. Spores thin-walled, smooth, hyaline .. .. *Asterostromella.*

Like *Aleurodiscus* but with warty setae (dendrophyses) forming projecting structures on the hymenium .. .. *Dendrothele.*

Receptacle resupinate; waxy, crustaceous or floccose. Hymenium waxy, smooth or tubercular, continuous, often cracked. Spores white or faintly coloured, smooth. No cystidia; sterile basidia (cystidioles) sometimes emergent *Corticium.*

Like *Corticium* but the hyphae and hymenium traversed by long cystidia-like bodies, whose walls are never thickened and are not incrusted with crystalline deposits (gloeocystidia) .. .. *Corticium* (Subgenus *Gloeocystidium*).

Receptacle effused or reflexed, at first thread-like. Hymenium with star-shaped brown setae. Spores globose or elongated .. .. *Asterostroma.*

Receptacle leathery or papery, reflexed or deeply concave. Hymenium rough with short close-set many-celled setae, almost *Hydnum*-like .. .. *Bonia.*

Receptacle incrusting, variously branched, lobed or effused, fibrillosely floccose, soft. Spores white, echinulate. Growing on fallen twigs and mosses .. .. *Cristella* (*Thelephora* p.p.).

Receptacle resupinate, soft, floccose. Hymenium granular or smooth, floccose. Flesh coloured. Spores coloured, echinulate or angular .. .. *Hypochnus* (*Tomentella*).

Like *Hypochnus* but spores violet, smooth .. .. *Hypochnella.*

Receptacle resupinate, effused, flocculose-pulverulent, *Hypochnus*-like. Spores straw-coloured, subelliptical, hyaline-appendiculate .. .. *Jaapia.*

Receptacle resupinate, waxy. Hymenium granular or smooth. Spores coloured, smooth. No cystidia .. .. *Coniophora.*

Like *Coniophora* but with cystidia .. .. *Coniophorella.*

Like *Corticium*, but with prominent hyaline or subhyaline cystidia in the hymenium or subhymenial tissues, which are generally thick-walled or incrusted with crystalline deposits. Spores white, rarely slightly coloured .. .. *Peniophora.*

Receptacle very small, hemispherical, on a narrowed base, bristly. Hymenium superior. Basidia with 2-4 sterigmata. Cystidia numerous, very long, lanceolate, rough, springing from the base of the receptacle. Spores smooth, white .. .. *Wiesnerina.*

CYPHELLACEAE.

Receptacles sessile, scattered, crowded or confluent, coriaceous-gelatinous. Hymenium smooth, becoming wrinkled or veined. Spores white or pale .. .. *Cytidia* (*Auriculariopsis*).

Receptacles stipitate or sessile, scattered or crowded, membranaceous or waxy. Hymenium smooth or veined. Spores white .. .. *Cyphella.*

Receptacles sessile, seated on a superficial felt-like, then floccose and fugacious mycelium, gregarious or fasciculate. Hymenium smooth. Spores white .. .. *Solenia.*

Receptacles sessile, more or less crowded, distinct, seated on or immersed in an effused membranaceous or floccose stroma. Spores white .. .. *Porothelium.*

Like *Cyphella* but spores coloured, smooth or echinulate.. *Phacocyphella.*

CLAVARIACEAE.

Receptacle erect, simple or branched, cylindrical, smooth or longitudinally striate, fleshy or subcoriaceous, generally putrescent. Spores white or ochraceous, smooth or rough. Growing on the ground or on wood .. .. *Clavaria.*

Receptacle erect, simple, very rarely branched, cylindrically-clavate, with a long, thin stem, often springing from a sclerotium, fleshy, waxy or tough. Spores white. Growing on fallen twigs and dead leaves .. .. *Typhula.*

Receptacle erect, simple, very rarely forked, club-shaped, with a short, thick, glabrous or villose stem, fleshy or waxy. Spores white. Growing on herbaceous plants .. *Pistillaria.*

Receptacle filiform, simple or branched, firm, tough. Spores white. Growing on the ground or on wood .. .. *Pterula.*

Systematic Description of the Species of Polyporaceae, Hydnaceae, &c.

BASIDIOMYCETAE.

HOMOBASIDIAE.

HYMENOMYCETALES—continued.

POLYPORACEAE.

Hymenium lining the insides of tubes, pores or pore-like spaces.

I. BOLETEAE.

Hymenium soft, separable from the pileus, lining the inside of fleshy tubes, at first covered by a veil, becoming fully exposed at maturity.

Spores white or yellowish.

GYROPORUS (Quel.) Pat.

(Gr., *gyros*, round; *poros*, a pore.)

"Pileus fleshy, tomentose or smooth. Stem central, velvety or glabrous, externally firm, fragile, internally spongy, often cavernous, base immersed in the soil. Pores white, then often yellowish, entire, round; tubes concolorous, free. Flesh white, firm, sometimes becoming blue on exposure to the air. Spores white or pale yellowish, oval, elliptical, pip-shaped or elliptic-oblong, smooth. Cystidia clavate. Growing on the ground."—Rea.

280. **Gyroporus caespitosus** Clel. (L., *caespes, caespitis*, a turf, hence *caespitosus*, growing in tufts).—Caespitose. Pileus up to 4in. (10 cm.) or more, convex and wavy, sometimes with the surface cracking, surface matt, dull and soft but sometimes rather shiny, Cinnamon Buff to Clay Colour (XXIX.) or near Isabella Colour (XXX.). Pores rather small, beginning as minute, irregular reticulations, rather irregular, dissepiments thick, with a sulcus round the stem, pallid brownish white or the colour of the pileus (near Ivory Yellow, XXX.), becoming pale wood colour when bruised, old or cut, tubes up to $\frac{1}{4}$ to $\frac{1}{2}$in. (6 to 12 mm.) long, attenuated both ways. Stem up to $3\frac{1}{2}$in. (8.7 cm.), swollen in the middle (up to $1\frac{5}{8}$ to 2in., 4 to 5 cm.), up to $\frac{3}{4}$ to 1in. (1.8 to 2.5 cm.) above and to $1\frac{1}{8}$ to $1\frac{1}{2}$in. (2.8 to 3.7 cm.) below, surface matt, the colour of the pileus, punctate with fine brownish granules. Flesh thick (up to 1in., 2.5 cm.), white, turning brownish or yellowish-brown. Spores oval to subspherical, white or slightly tinted, 8 to 8.9 x 5 to 5.5 μ. Moderately strong smell, taste mild. South Australia—At the base of a dead Eucalyptus stump at Burnside near Adelaide, National Park. New South Wales. May, June.

Spores pink.

TYLOPILUS Karst.

(Gr., *tylos*, a knot; *pilos*, a cap.)

"Pileus villose or glabrescent. Stem central, reticulate, apex granular or smooth. Tubes white, then pinkish, adnate or sinuate, long or short; orifices of pores concolorous, angular or round. Flesh unchangeable or slightly pinkish when exposed to the air. Spores pink, fusiform or oblong, smooth. Growing on the ground."—Rea.

No species yet recorded for South Australia.

Spores purple.

PHAEOPORUS Bataille.

(Gr., *phaios,* dusky; *poros,* a pore.)

"Pileus tomentose or velvety-silky. Stem central, blackish bistre, velvety or glabrous. Tubes grey or pinkish grey, sinuate or free, fairly long; orifices of pores concolorous, becoming greenish blue when touched. Flesh compact, becoming blue or grey when exposed to the air. Spores fuscous purple, elliptic fusiform, smooth. Growing on the ground."—Rea.

No species yet recorded for South Australia.

[*From watercolour by D.J.C.*

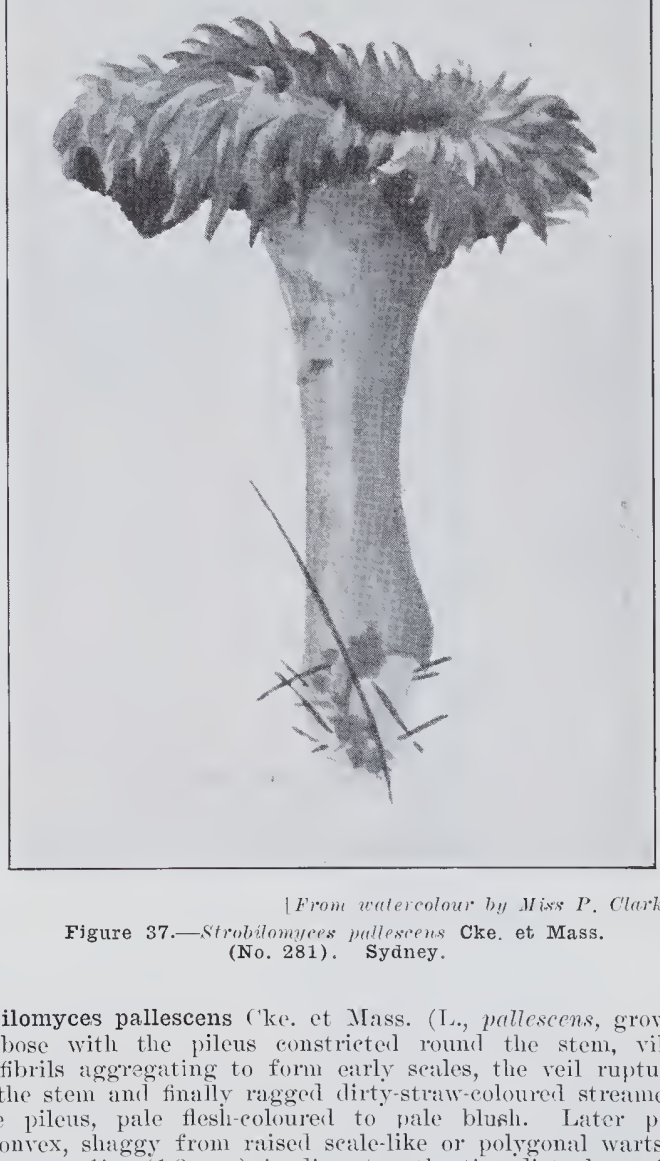
Figure 36.—*Strobilomyces pallescens* **Cke. et Mass. (No. 281). Sydney.**

Spores blackish or fuscous. Pileus covered with imbricate scales.

STROBILOMYCES Berk.

(Gr., *strobilos*, a fir cone; *mykes*, a fungus.)

"Pileus fleshy, firm, floccose, clothed with large imbricate scales. Stem firm, rigid, woolly or scaly, annulate. Tubes white, then greyish bistre, adnate, long, orifices of pores concolorous, angular. Flesh floccose, not putrescent, firm, light, becoming reddish or bluish grey and finally blackish on exposure to the air. Spores blackish purple, subglobose, verrucose. Cystidia present. Growing on the ground."—Rea.



[*From watercolour by Miss P. Clarke.*

Figure 37.—*Strobilomyces pallescens* **Cke. et Mass. (No. 281). Sydney.**

281. **Strobilomyces pallescens** Cke. et Mass. (L., *pallescens*, growing pale).—At first globose with the pileus constricted round the stem, villous floccose with felted fibrils aggregating to form early scales, the veil rupturing to form a sleeve on the stem and finally ragged dirty-straw-coloured streamers round the edge of the pileus, pale flesh-coloured to pale blush. Later pileus to 3in. (7.5 cm.), convex, shaggy from raised scale-like or polygonal warts (resembling a pineapple), some ½in. (1.2 cm.) in diameter, the tips dirty brownish, the bases almost crimson-lake, the fissures between pale straw-coloured. Hymenial surface convex, tubes almost free, ½in. (1.2 cm.) deep, attenuated each way, orifices rather large and angular, bright yellow to yellowish brown becoming dark. Stem up to 6in. (15 cm.), bulbous, especially when young, attenuated to ½in. (1.2 cm.) in the middle, solid, at first with ring-like remains of the veil, later smooth,

dull crimson-lake to pinkish purple above, greyish below. Flesh turning blue in the pileus, reddish in the stem. Spores elongated, longitudinally striate, pale yellow-brown, 17 to 22.5 x 6 to 8.5 μ. South Australia—Cut Hill on Willunga Road near Victor Harbour. New South Wales. January, March, May, December. (Figures 36 and 37.)

Spores ochraceous, ferruginous or olivaceous.

Tubes short, alveolar, decurrent.

BOLETINUS Kalchb.

(L., *boletinus*, diminutive of *Boletus*.)

No species yet recorded for South Australia.

Tubes very short, gyroso-plicate.

GYRODON Opat.

(Gr., *gyros*, round; *odōn*, a tooth.)

No species yet recorded for South Australia.

Tubes long.

BOLETUS (Dill.) Pat.

(L., *boletus*, a kind of mushroom from the Gr., *bolos*, a clod.)

"Pileus fleshy, dry, glabrous, tomentose, silky, viscid or glutinous. Stem central, equal, ventricose or bulbous; dry, glabrous, tomentose or viscid, sometimes reticulate; with or without a ring. Tubes long; adnate, sinuato-adnate or decurrent, rarely free; orifices of pores round, angular, unequal or toothed, often compound. Flesh thick, soft, putrescent. Spores ochraceous, ferruginous, olivaceous or fuscous, rarely colourless, fusiform, oblong-elliptic, elliptical or pip-shaped. Cystidia present. Growing on the ground, solitary, gregarious, caespitose or subcaespitose."—Rea.

The Boleti are fleshy fungi, readily undergoing decay like the fleshy agarics. They possess a cap and stem but the spore-bearing surface, instead of covering the surface of gills, lines a series of tubes which are readily separable from the substance of the pileus. Several species are common after autumn and winter rains.

KEY TO THE SPECIES.

With a ring.
- Pileus glutinous, resembling a yeast bun. Orifices old gold. Stem pallid, punctate. Near *Pinus* .. 282. *Boletus luteus.*

Without a ring.
- Spores elliptical, not mummy-shaped.
  - Pileus very large (11 to 24in.), brownish. Tubes becoming dark-brown. Stem very thick .. .. 283. *B. portentosus.*
  - Pileus tinted with yellow and red. Tubes mustard yellow, often with reddish tints. Stem yellow often with reddish-brown blotches .. .. 284. *B. ovalisporus.*
- Spores elongated mummy-shaped.
  - Stem reticulated with raised lines.
    - Tubes yellowish-green, orifices reddish. Pileus reddish-brown. Stem yellow, reticulations reddish-brown. Flesh turning bluish .. .. 285. *B. luridus.*

Tubes old gold. Pileus viscid, dark-brown. Stem dark sooty brown .. .. 286. *B. fuscus.*

Stem not reticulated.

Tubes yellow, orifices crimson.

Pileus maroon to vinaceous buffy brown, not viscid. Stem yellow punctate with red. Flesh sometimes turning blue .. .. 287. *B. erythropus.*

Tubes yellow, orifices not red.

Pileus viscid.

Near *Pinus*. Pileus brown. Tubes mustard yellow to old gold. Stem pale yellow, punctate .. .. 288. *B. granulatus.*

Not under *Pinus*. Pileus brown. Tubes dingy yellow to buffy citrine and olive. Stem punctate brown .. .. 289. *B. punctato-brunneus.*

Pileus yellow and reddish-brown. Tubes mustard yellow. Stem yellow punctate with red. Flesh turning blue .. .. .. 290. *B. sinape-cruentus.*

Pileus not viscid.

Pileus blotched with red, reddish brown and yellow. Tubes yellow. Stem yellow with reddish-brown blotches. Flesh yellow, sometimes blue .. .. 291. *B. multicolor.*

Tubes buffy-brown to dark olive-buff.

Pileus subfibrillose, often cracking, buffy-brown. Stem dark brown, sometimes yellowish above. Flesh bluish becoming dark brown .. .. 292. *B. brunneus.*

Pileus smooth or finely velutinate, brown. Stem finally punctate dark-brown. Flesh turning dark-brown, without any blue .. .. .. 293. *B. fuscescens.*

Tubes dingy flesh colour to cinnamon drab.

Pileus viscid, yellowish-brown to Mars brown. Stem near chestnut. Flesh soft. Spores 17 to 18.7 x 5 μ .. .. 294. *B. mollis.*

282. **Boletus luteus** (L.) Fr. (L., *luteus*, yellow).—Pileus up to 6in. (15 cm.), convex, glutinous to viscid, often with attached leaves, the gluten when very wet presenting a mouldy appearance covering the soft yellowish-brown surface which has much the colour and appearance of a yeast bun, cuticle peeling. Tubes adnate or with a slight sulcus round the stem, $\frac{3}{8}$in. (10 mm.) deep, orifices small, polygonal, pale yellow then near old gold. Stem up to $4\frac{1}{2}$in. (11 cm.), 1in. (2.5 cm.) thick, solid, punctate with small granules, pallid yellowish. Ring nearly median, ample, membranous, collapsing round the stem, yellowish. Flesh soft, tasteless, with a slight yellowish tinge near the tubes, slightly reddish in the stem. Spores mummy-shape, brownish, 8 to 10 x 3.5 μ. Gregarious or subcaespitose, always under or near species of *Pinus*. South Australia—Mount Lofty, Upper Sturt, Kuitpo, Mount Compass, Mount Pleasant, Kalangadoo, Mount Gambier and Mount Burr State Forests. May, June. (Figure 38.)

283. **Boletus portentosus** Berk. et Br. (L., *portentosus*, portentous).—Pileus 11 to 15in. (27.5 to 37.5 cm.) or even 24 x $18\frac{1}{2}$in. (60 x 46.2 cm.), convex to nearly plane, sometimes with the centre a little depressed, finely tomentose or

flecked with brownish to greenish-brown fibrillose scales, tending to crack, brown with a greenish tinge or dingy yellowish-olive (tints approaching brown pink and browner than bistre green). Tubes ¾ to 1¼in. (1.8 to 3 cm.) long, just reaching the stem but leaving a slight sulcus, pinkish orange-yellow or yellowish-green becoming dark-brown when old or injured (near chrome yellow and golden yellow, with reddish stains), orifices moderately large, rather irregular. Stem sometimes excentric, up to 7½in. (19 cm.) long, very stout (up to 7in., 17.5 cm., thick in the middle, 5½in., 13.7 cm., thick above), bulbous, ending below in a short conical root, mouldy-looking green with tints of yellow and brown or dingy yellowish-brown (tints of old olive green, olive brown), darker below, punctate-looking from groups of villosities, not reticulated. Flesh up to 2in. (5 cm.) thick, whitish but slightly dingy, sometimes turning yellowish with shades of

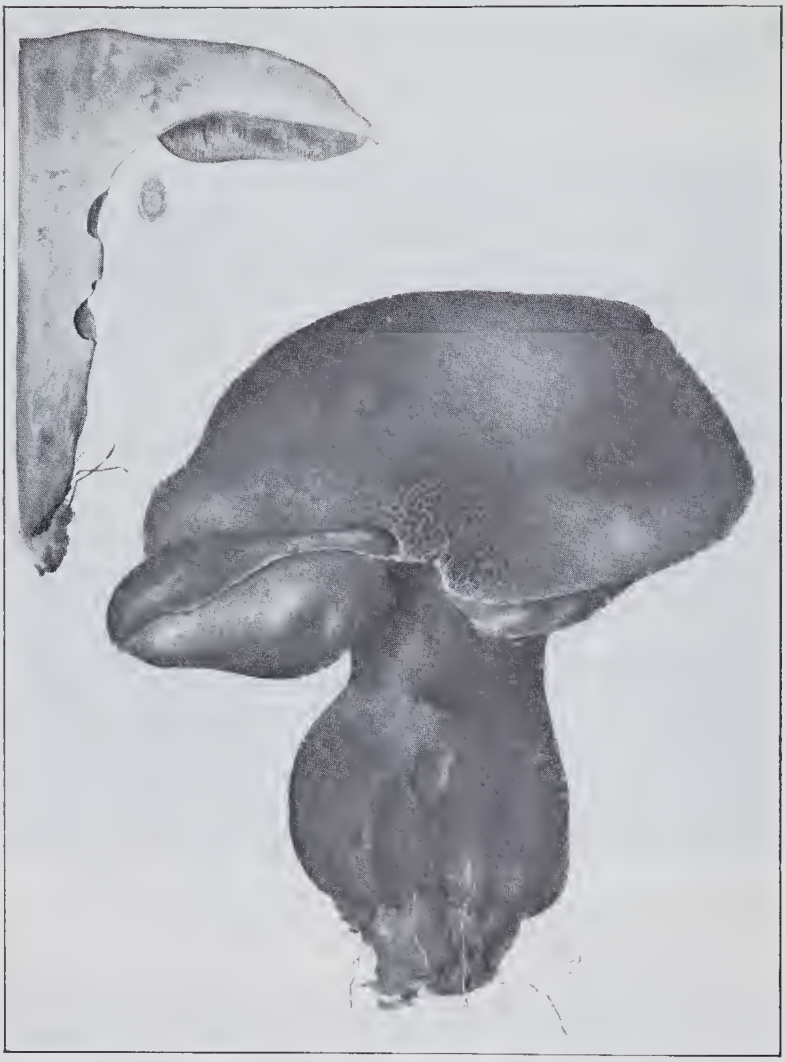
[*Photo. by E. Rogers.*

Figure 38.—*Boletus luteus* **(L.) Fr. (No. 282). National Park, South Australia. Flesh edible when young.**

sage-green or bluish-green and around insect marks and sometimes in the stem reddish, soft in texture like firm cotton-wool and difficult to cut. Spores obliquely elliptical or pear-shaped to oval, brownish, 7 to 8.5 x 5 to 6 μ. Taste mild. The largest specimen food weighed 7lbs. 2ozs. South Australia—Montacute, Bull's Creek, Kinchina, MacDonnell Bay (S.E.). New South Wales. January to May, October. (Figure 39.)

284. **Boletus ovalisporus** Cle. (L., *ovalis*, oval; *spora*, seed).—Pileus 2 to 6½in. (5 to 16 cm.), irregularly convex to plane and upturned, viscid when moist, smooth and shining or matt when dry, edge turned in somewhat when young, tinted with shades of yellow and red (Light Cadmium, IV., mixed with Tawny Olive, XXIX.; near Naples Yellow, XVI., with some stains of reddish-brown or Ochraceous Tawny, XV., Dresden Brown, XV., Snuff Brown, XXIX., etc., with tinges of yellow and occasionally of Claret Brown, I.). Tubes with a slight sulcus round the stem, ¼ to ⅜in. (6 to 10 mm.) deep, dissepiments thin, paler than Mustard Yellow (XVI.), near Old Gold (XVI.), near Baryta Yellow (IV.),

often with tints of reddish-yellow or reddish-brown, turning green when bruised, orifices rather small, 0.5 to 0.75 mm., not lacerated. Stem 1 to 3in. (2.5 to 7.5 cm.), stout ¾ to 1⅛in. (1.8 to 2.8 cm.), equal or attenuated upwards or downwards, surface matt, very bulbous when young, lighter than Light Cadmium (IV.), Primuline Yellow (XVI.), Light Baryta Yellow (IV.) or Mustard Yellow



[*From watercolour by Miss P. Clarke.*

Figure 39.—*Boletus portentosus* **(No. 283). Sydney. Reduced by more than ½.**

(XVI.), often with blotches of reddish-brown or Claret Brown (I.). Flesh thick in the centre of the pileus, attenuated outwards, Straw Yellow (XVI.), Aniline Yellow (XVI.) or Light Cadmium (IV.), turning in places Dusky Bluish Green (XXXIII.) or, especially where insect-eaten, reddish-brown. Slight peculiar fragrant smell. Sometimes densely caespitose and distorted. Spores elliptical, oblique, pale brown, 5.5 to 9 x 3.7 to 5.3 μ. South Australia—Kuitpo, National Park, Mount Lofty, Myponga, Encounter Bay. May to July.

285. **Boletus luridus** (Schaeff.) Fr. (L., *luridus*, lurid in colour).—Pileus up to 4¼in. (10.6 cm.), convex to subconvex, slightly irregular, surface dull, smooth with a few adpressed fibrils, reddish-brown. Tubes adnate or with a slight sulcus round the stem, sligltly attenuated both ways, ¼in. (6 mm.) lengthening to ½in. (12 mm.), pallid yellowish-green becoming dark dingy green, orifices reddish. Stem up to 2½in. (6.2 cm.), stout (1⅜in., 3.5 cm.), when young swollen in the middle, sometimes nearly even, finely reticulated with raised reddish-brown lines, the interspaces yellowish, root conical. Flesh turning bluish, especially when young, reddish-brown where insect-eaten. Spores mummy-shaped, brownish, 9.5 to 14 x 4.8 to 6 μ. South Australia—Under *Eucalyptus*, Kuitpo. May.

The species is characterised by the reddish-brown pileus, the yellowish-green tubes with reddish orifices and the yellow stem reticulated with reddish-brown veins. In British specimens the tubes are free.

286. **Boletus fuscus** Clel. (L., *fuscus*, dark).—Pileus 3in. (7.5 cm.), convex, very viscid, dark-brown near chocolate. Tubes ½in. (1.2 cm.) deep, old gold in colour, dingy dark-greenish when bruised, orifices moderately large, irregular. Stem 2½in. (6.2 cm.), stout (¾in., 1.8 cm.), reticulate above, rather punctate below, solid, dark sooty brown. Tubes turning bluey-green when cut, the colour extending a little into the adjacent flesh, the rest of the flesh of the pileus and that of the stem whitish with brownish tints. Spores mummy-shaped, dingy pallid brown, 9 to 10 x 3.7 to 5 μ. Under shrubs, etc. South Australia—Mount Lofty.

287. **Boletus erythropus** (Pers.) Quel. (Gr., *erythros*, red; *pous*, a foot).—Pileus 2 to 3½in. (5 to 8.7 cm.), convex, fibrillose-matt or felted with low irregular ridges, near Maroon and Victoria Lake (I.) or darker than Buffy Brown (XL.) with vinaceous tints. Hymenial surface convex with a deep broad sulcus round the stem, tubes adnexed with a trace of decurrence, up to ¾in. (1.8 cm.) deep, near Aniline Yellow (IV.) or Honey Yellow (XXX.), turning greenish-yellow, orifices minute, crimson or turning reddish. Stem 1½ to 3in. (3.7 to 7.5 cm.), equal but a little conical at the root, thick (1in., 2.5 cm.), not reticulated, fibrillose, punctate with maroon on an old gold base or mottled with reddish-brown and yellow or pallid mottled with very dark brown. Flesh sometimes turning blue or green in places, reddish where insect eaten or dingy yellowish-white turning smoky or reddish in parts. Spores mummy-shape, brown, 10 to 13 x 4 μ. On the ground. South Australia—Mount Lofty, National Park, Willunga Hill. May to June.

Characterised by the yellow tubes with red orifices, the yellow stem punctate with red and the fibrillose-matt, not viscid, cap. Our Australian plants with yellow tubes and red orifices show variation as to the red points on the usually yellow stem and in the colour of the flesh but are probably best considered as all forms of the European *B. erythropus*.

288. **Boletus granulatus** (L.) Fr. (L., *granulatus*, granulated, from the granules left round the orifices of the tubes from the drying of a whitish milk dripping from the pores when young—a feature not hitherto noticed in Australian specimens).—Pileus 2½ to 4in. (6.2 to 10 cm.) or more, viscid to very viscid when moist, soft to the touch when dry, irregularly convex, sometimes depressed in places or edges upturned, edge inturned when young, cuticle peels, near Sayal Brown (XXIX.), Buckthorn Brown (XV.), Sudan Brown (III.) or Ochraceous Tawny (XV.). Tubes with a slight sulcus round the stem, up to ½in. (1.2 cm.) deep, attenuated externally and internally, orifices about 1 mm. diameter, dissepiments thin, when young Deep Colonial Buff (XXX.) or Mustard Yellow to Wax Yellow (XVI.), when older between Old Gold (XVI.) and Orange Citrine (IV.). Stem 1¾ to 2½in. (4.4 to 6.2 cm.), stout (1.5 cm.) to slender (8 mm.), more or less equal, more or less punctate with brown specks, pale yellow to deep yellow with brownish stains when old and sometimes tints of Light Brownish Vinaceous (XXXIX.) at the base. Smell slight. Flesh soft, pale yellow to Strontian Yellow (XVI.). Spores mummy-shape, brownish, 9 x 4 μ. On the ground, always under or near species of *Pinus*. South Australia—Adelaide, National Park, Encounter Bay, Basket Range. New South Wales. May. (Figure 40.)

This is a very common species never found except near *Pinus*. It is readily recognised by its glutinous cap (when moist) which is brown and somewhat like a yeast bun, its pure yellow tubes becoming old gold in colour, the dark granules

on the stem, the absence of a ring, and the slightly yellow soft flesh. The white milk escaping from the tubes when young has not been seen in Australian specimens. It closely resembles *B. luteus* which differs in having a ring. The two species may grow together but in general *B. granulatus* occurs on the lowlands, *B. luteus* on the highlands.

289. **Boletus punctato-brunneus** Clel. (L., *punctatus*, dotted; *brunneus*, brown, in reference to the stem).—Pileus 3½ to 5in. (8.7 to 12.5 cm.), irregularly convex to nearly plane, sometimes finally upturned, viscid when moist, finely velvety or shiny when dry, dark brown to brownish tan (a little darker than Verona Brown, XXIX., becoming Warm Sepia, XXIX. and darker, Russet to Mars Brown, XV., Cinnamon Brown, XV., near the edge). Tubes rounded or with a deep sulcus round the stem, ½ to ¾in. (1.2 to 1.8 cm.) deep, at first pallid yellow and then dingy yellow or livid greenish-yellow (yellower than Old Gold, XVI., to near

[*Photo. by S. Tee.*

Figure 40.—*Boletus granulatus* **(L.) Fr. (No. 288). Sections. National Park. Flesh edible when young. Reduced in size.**

Buffy Citrine, XVI.), becoming darker than Saccardo's Olive (XVI.) or greenish when old or bruised, orifices moderately small, dissepiments rather thick. Stem 1¼ to 3½in. (3.1 to 8.7 cm.), stout (¾ to 1⅞in., 1.8 to 4.6 cm.) to slender, equal or tapering below or sometimes slightly bulbous, passing into mycelium traversing the soil, pallid to dark brownish, punctate with brown above or below. Flesh of the pileus up to ¾in. (1.8 cm.) in the centre, gradually attenuated outwards, turning slightly reddish or brownish or pallid, sometimes bluish-green near the tubes, flesh of the stem brownish. Spores mummy-shape, pale brownish, 9 to 12 x 3 to 4 μ. South Australia—Waterfall Gully, Mount Lofty, in *Eucalyptus* forest in Second Valley Forest Reserve, Middleton, Harriet River Station (K.I.). April to June, August, December.

Characterised by the brown viscid pileus, yellowish tubes, and brownish punctate stem. It resembles *B. granulatus* (L.) Fr., but the tubes are not so clear a yellow, the stem is browner and the species is not associated with *Pinus*. It also resembles *B. brunneus* Cke. et Mass. but differs in the viscid pileus and the yellower tubes.

290. **Boletus sinape-cruentus** Clel. (L., *sinape*, mustard-seed; *cruentus*, blood-red, in reference to the colours of the stem).—Pileus 3 to 5in. (7.5 to 12.5 cm.), convex, occasionally depressed in the centre, viscid, Mustard Yellow (XVI.) with brown patches and finally deep brown (Rood's Brown, XXVII.) with yellow-brown patches round the edge, or Bay (II.) in the centre passing to Mustard Yellow externally, or Morocco Red to Maroon (I.). Tubes with a sulcus round the stem, attenuated inwards, slightly ventricose outwards, $\frac{1}{5}$ to 1in. (5 to 25 mm.) deep, angular, unequal, near Mustard Yellow, Colonial Buff to Deep Colonial Buff (XXX.), or Honey Yellow (XXX.) approaching Old Gold (XVI.), turning dark dingy green especially when bruised, orifices 0.5 to 1 mm. diameter, dissepiments thin. Stem 2 to 3in. (5 to 7.5 cm.), $\frac{3}{4}$in. (1.8 cm.) thick in the middle, attenuated downwards and sometimes upwards as well, Deep Colonial Buff (XXX.), or Light Cadmium (IV.) to Mustard Yellow, with a broad band of punctate red (near Pompeian Red, XIII.) in the middle or at the base. Flesh up to $1\frac{1}{2}$in. (3.7 cm.) thick in the pileus, yellowish turning bluish-green and later sometimes reddish-brown; flesh of the stem sometimes Primuline Yellow (XVI.) above, turning bluish-green in places, sometimes dark red at the base. Spores mummy-shape, brown, 10.5 to 15 x 4 to 5 μ. South Australia—National Park, Mount Lofty, Eagle-on-the-Hill. April, June.

The species is characterised by being viscid when moist, by the yellow and reddish-brown pileus, the mustard yellow tubes, and yellow stem punctate with red below, and by the flesh turning blue in parts.

291. **Boletus multicolor** Clel. (L., *multus*, many; *color*, colour).—Pileus 2 to 3in. (5 to 7.5 cm.), convex, surface dull, blotched with olive brown with yellowish or reddish-brown areas, in places near Deep Corinthian Red (XXVII.) or vivid saffron yellow to pallid yellow with tints of red. Hymenial surface convex with a sulcus round the stem, tubes $\frac{1}{4}$ to $\frac{1}{2}$in. (6 to 12 mm.) deep, Amber Yellow (XVI.) or saffron turning greenish-yellow, orifices minute, about 3 in 1 mm., rounded. Stem 1 to $4\frac{1}{2}$in. (2.5 to 11.2 cm.), stout, up to $1\frac{1}{2}$in. (3.7 cm.) in the centre, 1in. (2.5 cm.) above, base sometimes attenuated, somewhat granular or slightly rugose, yellow to saffron yellow with reddish-brown blotches or dots. Flesh yellow, becoming reddish (especially where insect eaten) or blue in places. Spores mummy-shape, pale yellow, 9.5 to 11 (occasionally 13), x 2 to 4 μ. South Australia—Bangham (S.E.), Encounter Bay, Mount Compass, Second Valley, Kinchina. May, June.

The species is characterised by the non-viscid pileus variously coloured with yellow, red and brown, the saffron coloured tubes, the yellow stem with reddish-brown blotches, the yellow flesh usually but not always turning blue in places, and the pale spores.

292. **Boletus brunneus** Cke. et Mass. ? (L., *brunneus*, brown).—Pileus $2\frac{1}{4}$ to 6in. (5.6 to 15 cm.), convex or nearly plane with irregular depressions, dull subfibrillose, dirty brown in places near Buffy Brown (XL.) to dark brown. Tubes with a slight sulcus round the stem, up to $\frac{3}{4}$in. (1.8 cm.) deep, pallid yellow turning greyish to Buffy Brown, orifices rather small, pentagonal. Stem up to $2\frac{1}{2}$in. (6.2 cm.), stout, $1\frac{1}{2}$in. (3.7 cm.) thick at the base, rather bulbous, slightly fibrillose, becoming dark brown to blackish below, pallid brown to pallid yellowish above, root conical. Whole plant becoming dark brown. Flesh up to $1\frac{1}{2}$in. (3.7 cm.) thick, whitish becoming bluish-green in patches with reddish-brown areas, finally dark brownish. Spores mummy-shape, slightly brown, 10 to 13 x 4.2 to 4.5 μ. South Australia—Kinchina. June, October.

Characterised by the brown subfibrillose pileus, the tubes becoming buffy brown, the stout stem becoming dark brown to blackish below and the flesh becoming bluish-green and reddish-brown in places and finally dark brownish. This may be *B. brunneus* of Cooke and Massee, though the tubes are not free and the pores are not "rather large." On the other hand, it may be a form of *B. fuscescens* Clel. in which the flesh shows bluish-green patches before turning dark brownish.

293. **Boletus fuscescens** Clel. (L., *fuscescens*, becoming dusky, in allusion to the colour of the pileus and the flesh).—Pileus $2\frac{1}{2}$ to $5\frac{1}{2}$in. (6.2 to 13.7 cm.), deeply convex, often depressed in the centre or rather irregular, soft to the touch, smooth or finely velutinate to velutinate-fibrillose, tending sometimes to crack into small scales of adpressed fibrils, probably subviscid when moist, edge turned in when young, near Snuff Brown and Bister (XXIX.), darker in places, or Cinnamon Drab (XLVI.), paler than Fuscous (XLVI.) or Wood Brown (XL.)

becoming near Bone Brown (XL.) in the centre. Tubes with a sulcus usually slight round the stem, ½ to ¾in. (1.2 to 1.8 cm.) deep, attenuated both ways, orifices 2 to nearly 1 in 1 mm., rounded, sometimes rather gyrose, tubes and orifices Deep to Dark Olive Buff (XL.) to Colonial Buff (XXX.) and Chamois (XXX.), becoming discoloured dark brownish, Light Greyish Olive (XLVI.) when young. Stem 2 to 2½in. (5 to 6.2 cm.), stout (¾ to 1¾in., 1.8 to 4.3 cm., thick), very bulbous when young (up to 2in., 5 cm.), Deep Olive Buff (XL.), then Colonial Buff, finally dark brown (Fuscous, XLVI.) and punctate except just below the tubes which is pallid. Flesh pallid, turning brownish and nearly blackish. Spores mummy-shape, brown-tinted, 9 to 13 x 3.2 to 4 μ. South Australia—In sandy soil, Encounter Bay; Kuitpo, Willunga Hill, Mount Lofty, MacDonnell Bay (S.E.). April to June, September.

Characterised by the large snuff-brown to wood-brown pileus, the olive buff tubes and orifices, the bulbous stem becoming dark brown and punctate except below the tubes, and the flesh becoming discoloured brownish.

294. **Boletus mollis** Clel. (L., *mollis*, soft).—Pileus 3½in. (8.7 cm.), nearly plane, viscid, yellowish-brown to Mars Brown (XV.). Hymenial surface convex with a deep sulcus round the stem, tubes up to 1in. (2.5 cm.) deep, orifices 1 mm. in diameter, irregular, dissepiments thin, near Cinnamon Drab (XLVI.) and paler (dingy flesh-coloured). Stem 1½in. (3.7 cm.), relatively slender (1 cm. in the middle), expanding above, slightly fibrillose, not reticulated, near Chestnut (II.) below, paler yellowish-brown above. Flesh 6 mm. deep. Whole fungus soft. Spores mummy-shape, microscopically brownish, 17 to 18.7 x 5 μ. On the ground. South Australia—Near Penola. May.

II. POLYPOREAE.

Hymenium exposed from the first, lining coherent tubes, sometimes toothed, or anastomosing plates.

I. Receptacle pileate, not gelatinous.

1. Tubes entire.

A. Tubes usually in strata.

a. Receptacle hard, woody or corky. Spores white or coloured.

FOMES Fr.

(L., *fomes*, tinder.)

"Pileus hard, woody or corky, dimidiate, hoof-shaped or resupinate; sessile, often concentrically zoned, and covered with a rigid crust. Tubes homogeneous or heterogeneous, often stratose. Flesh white or coloured. Spores white or coloured; globose, subglobose, elliptical or elliptic-oblong; smooth. Cystidia present or absent, coloured or hyaline. Perennial. Growing on wood."—Rea.

The genus *Fomes* comprises perennial fungi, often large and heavy, with a hard, woody or corky texture, and with the tubes usually arranged in strata, representing annual additions. Most of our species, some of which are quite common, have the substance yellowish-brown in colour. Several are destructive parasites of forest trees.

KEY TO THE SPECIES.

Context yellowish-brown.

Spores mostly or all hyaline.

Large, massive, hoof-shaped. Context Sudan brown to buckthorn brown. Brown setae sometimes present. Orifices 5 to 6 in 1 mm. .. .. 295. *Fomes robustus.*

Less massive. Context tending to be darker. Occasional brown setae. Orifices 3 in 1 mm. .. .. 296. *F. robustus* var. *Melaleucae.*

Like *F. robustus*. Setae numerous .. .. .. 297. *F. setulosus.*

More or less effuso-reflexed, 2½ to 3in. Hymenial surface irregularly concave. Context ochraceous tawny to Sudan brown. Brown setae abundant. Orifices 4 to 5 in 1 mm. .. .. 298. *F. conchatus.*

Spores mostly or always brown. No setae.

Context ochraceous tawny and browner.

Hoof-shaped, usually about 2 x 1in., crust tending to crack rimosely. Context ochraceous tawny and browner. No setae. Orifices 2 to 3 in 1 mm. .. 299. *F. rimosus.*

Similar, surface smoother. Orifices 2 in 1 mm. .. .. 300. *F. badius.*

Similar, surface tomentose, context a little darker. Orifices 3 in 1 mm. .. 301. *F. Niaoulii.*

Context darker (russet to Verona brown). Tubes long. Orifices 2 in 1 mm. .. .. 302. *F. Tepperi.*

Context near yellow ochre.

Hoof-shaped. Upper surface nodular, velvety, buckthorn brown. Pores near same, 4 in 1 mm. .. .. 303. *F. Lloydii.*

Spores brown, setae present.

Hoof-shaped. Resembles *F. rimosus*. Context raw sienna to Sudan brown. Orifices 4 to 5 in 1 mm. .. .. 304. *F. Yucatensis.*

Applanate. Context darker, ochraceous tawny to Sudan brown. Orifices 5 in 1 mm. .. 305. *F. senex.*

Context purplish fuscous.

Forming large effused patches up to 8 x 3½in. Hymenium becoming fuscous. Context purplish fuscous. Spores white, 5 x 3.5 μ .. .. 306. *F. lividus.*

Context pinkish-buff.

More or less hoof-shaped. Surface hard, sublaccate, cinereous to dark brown, sulcate. Orifices 6 in 1 mm. .. .. 307. *F. hemitephrus.*

295. **Fomes robustus** Karst. (L., *robustus,* firm).—Massive, heavy, hoof-shaped or subglobose, sometimes subresupinate, 6in. (15 cm.) or more laterally, 3 to 4in. (7.5 to 10 cm.) vertically and 2 to 3 (5 to 7.5 cm.) or more from before backwards. Pileus convex, descending, fulvous brown, subtomentose when young, being replaced by a dark greyish-brown to blackish smooth crust, tending to crack into large polygonal areas, the growing edge rounded, often glaucous grey. Hymenial surface horizontal, pore orifices regular, minute, about 5 to 6 or more in 1 mm., dissepiments rounded. Context radiating, woody, with the pore strata Sudan Brown to Antique Brown (III.) or Buckthorn Brown (XV.). Spores subspherical, hyaline, rarely very slightly tinted, 6 to 8 μ, 9 x 7 μ. Brown acuminate setae usually absent, occasionally present, 27 x 10 μ, 19 x 3.7 μ. Young penetrating mycelium Yellow Ochre (XV.). On trunks of living trees, from the base to about 10ft. up, and occasionally on shrubs (*Eucalyptus viminalis* Labill., *E. rostrata* Schl., *E. ovata* Labill., *E. oleosa* F.v.M., *E. odorata* Behr. et Schl., *E. fasciculosa* F.v.M., *Melaleuca decussata* R.Br., *Casuarina stricta* Ait., *C. lepidophloia* F.v.M., *Callitris propinqua* R.Br., *Rhamnus alaternus* L., Sweet Almond (*Amygdalus communis* L.), *Robinia pseudacacia* L. South Australia—Adelaide Park Lands, Beaumont, National Park, Kuitpo, Kinchina, Encounter Bay, Clare, Lake Bonney (S.E.), Port Lincoln, near Ooldea. New South Wales. Perennial.

This species, which may be large and heavy and can only be dislodged from trunks with difficulty, is quite common. It is a destructive parasite of forest trees. Microscopic examination for spores and setae is usually necessary to distinguish *F. robustus* (white spores and setae few or none) from *F. setulosus* (white spores, setae numerous) and *F. rimosus* (brown spores, no setae).

296. **Fomes robustus** Karst. var *Melaleucae* Clel. (*Melaleucae*, of the genus *Melaleuca*).—Pileus ungulate, extended ungulate or irregular, laterally attached throughout most of its breadth to living trees, 4½in. or more vertically, 3in. broad, 1¾in. thick (11.2 x 7.5 x 4.4 cm.), sulcately zoned, laterally rounded, young zones minutely velutinate becoming smooth, replaced in older zones by a hard crust becoming rimosely cracked, hoary becoming dark brown. Context woody, radiating, most of the substance composed of the old pore layers, many of the old tubes stuffed with pallid mycelium, Buckthorn Brown to Dresden Brown (XV.), Ochraceous Tawny (XV.) to near Cinnamon Brown (XV.). Hymenial surface plane, horizontal; tubes indistinctly differentiated from older layers, about ⅜ to ⅕in. (1.5 to 2 cm.) long; orifices about 3 in 1 mm., rounded to a little irregular; dissepiments rounded, equal to the diameter of the orifices to half this. An occasional pointed acuminate yellow-brown seta, 20 x 5 μ. Spores numerous, spherical, a little irregular, thick-walled, hyaline but sometimes brown,

[*Photo. by S. Tee.*

Figure 41.—*Fomes conchatus* **(Pers.) Fr. (No. 298). Mount Lofty. Two specimens. Reduced slightly.**

8 to 9.5 μ. South Australia—On trunks of living *Melaleuca halmaturorum* F.v.M., two to six feet from the ground, on the brackish-water banks of Inman River, Encounter Bay. Perennial. This species seems indistinguishable from *F. robustus* save in the size of the orifices and an occasional coloured spore.

297. **Fomes setulosus** Petch. (L., *setulosus*, possessing setae).—This resembles *F. robustus* but has numerous brown setae with swollen bases and abruptly contracted slender points, 19 x 6.5 μ. C. G. Lloyd states that the context colour is tawny (*i.e.*, Ochraceous Tawny, XV.) whereas in *F. robustus* it is Yellow Ochre (XV.). In the Australian form of *F. robustus*, the context varies from Sudan Brown and Antique Brown (III.) to Buckthorn Brown (XV.), with the penetrating mycelium Yellow Ochre (XV.). The real point of difference seems to lie in the abundance of setae in *F. setulosus* and their rarity or absence in *F. robustus*. South Australian specimens of *F. setulosus* are ungulaform, about 5in. laterally x 2 to 3in. deep x 3in. high (12.5 x 5 to 7.5 x 7.5 cm.) with a dark brown hard

rimosely cracking crust, rounded pale edge, more or less horizontal pore surface near Saccardo's Umber (XXIX.), orifices minute, about 7 in 1 mm., context radiating, Ochraceous Tawny (XV.), spores white, spherical, 6.5 μ, setae as above. South Australia—At the base of *Eucalyptus rostrata* Schl. and on *E. viminalis* Labill. National Park. May, June.

298. **Fomes conchatus** (Pers.) Fr. (Gr., *konchē*, a mussell shell).—Pileus 2½ to 3in. (6.2 to 7.5 cm.) laterally, projecting ½ to 1in. (1.2 to 2.5 cm.), more or less effuso-reflexed, extending vertically 1 to 3in. (2.5 to 7.5 cm.), sometimes forming a rather thin acute-edged bracket, sometimes mostly resupinate with a narrow thicker upper surface, sometimes imbricate, the hymenial aspect irregularly concave and often shell-shaped. Upper surface tomentose, slightly irregular, sometimes concentrically sulcate, Prout's Brown (XV.), young growing portions more tomentose, irregularly nodular, Tawny Olive (XXIX.), old portions becoming bare, with a hard crust tending to crack a little, becoming brownish black. Context sometimes rather thin, 2 to 10 mm., hard-corky, rather brittle, Ochraceous Tawny (XV.) to near Sudan Brown (III.). Tubes shallow, about

[*Photo. by S. Tee.*

Figure 42.—*Fomes rimosus* Berk. (No. 299). On Tea-tree, Hallett's Cove. Reduced slightly.

1 mm. deep, old tube layers indistinct, usually oblique, colour of the context or a little paler, orifices 4 to 5 in 1 mm., slightly irregular, dissepiments rather thin, near Snuff Brown (XXIX.) or paler. Spores subspherical, hyaline, 4.5 to 5.5 μ. Setae acuminate, thickened at the base, brown. South Australia—At the base of *Eucalyptus obliqua* L'Herit., Kuitpo; Willunga Hill; Mount Lofty. New South Wales. Perennial. (Figure 41.)

This species resembles small forms of *F. robustus*, but the pileus is thinner and the pore surface more or less concave.

299. **Fomes rimosus** Berk. (L., *rimosus*, full of cracks).—Moderately large, hoof-shaped, laterally attached throughout its width, usually about 2in. (5 cm.) laterally, 1in. (2.5 cm.) from before backwards and 1½in. (3.7 cm.) vertically Pileus convex, extending upwards at the attachment, zonately sulcate and bulging between the depressions, Drab (XLVI.) or brownish, becoming greyish-brown or nearly black in the oldest portion, villous near the rounded growing edge, then becoming smooth and crustose, the crust cracking, often into quadrilateral segments (var. *Casuarinae* Clel. et Cheel), edge Buckthorn Brown (XV.). Hymenial surface nearly horizontal and plane, pore orifices small, about 2 to 3 in 1 mm., equal, rounded, Cinnamon Brown (XV.) to Snuff Brown (XXIX.), Dresden Brown (XV.) in a glancing light. Context thick, firm, radiating from the attach-

ment, moderately light when dry, Ochraceous Tawny (XV.) and browner. Pore layer up to ½ to 1½in. (1.2 to 3.7 cm.) deep. Spores subspherical to oval, 5.5 to 8 x 4 to 6.4 μ. No setae. On living trunks of *Eucalyptus olcosa* F.v.M., *E. odorata* Beh. et Schl., *Melaleuca pubescens* Schau., *Acacia armata* R. Br., *Casuarina stricta* Ait., *C. lepidophloia* F.v.M. South Australia—Kinchina, Clare, MacLaren Vale, Hallett's Cove, Overland Corner, Renmark, Dilkera, Mount Wedge near Elliston (E.P.), Port Lincoln, Mount Dutton Bay (E.P.), Ooldea. New South Wales. Perennial. (Figure 42.)

This is quite a common hoof-shaped species with ochraceous tawny substance and drab to dark brown upper surface possessing a hard crust which often cracks into segments. The brown spores and absence of setae separate it from *F. robustus* and *F. setulosus* which it otherwise resembles.

300. **Fomes badius** Berk. (L., *badius*, bay-coloured, approaching chestnut).—C. G. Lloyd describes this species as having the same general appearance, shape and context colour as *F. rimosus* but the surface is smoother, the pores a little larger, and the spores larger (6 to 7 μ). A South Australian specimen, probably from the Mount Lofty Ranges, identified by Lloyd, formed a hoof-shaped bracket resembling a small specimen of *F. rimosus* but with the upper surface, though rimose and dark brown in the older portion, rather smoother, the rounded growing edge paler brown and velvety. The orifices were about 2 in 1 mm., the context nearer to Sudan Brown (III., but less yellow) than to Raw Sienna (III.), and the subspherical dark yellow-brown spores 6.5 x 5 μ. Specimens similarly identified by Lloyd from Gympie, Queensland, are also small and the upper surfaces smoother but the orifices are 3 in 1 mm. and the spores 5 x 3.4 μ. These specimens thus have spores whose size does not exceed the measurements we have found in *F. rimosus*. *F. badius* may thus be a form of *F. rimosus*.

301. **Fomes Niaouli** Patouillard.—C. G. Lloyd considers that this species, if distinct from *F. rimosus*, differs chiefly in the upper surface being dark brown or black, matted and tomentose, the spores being also larger and the context dark brown (Argus). The species has not been recognised in South Australia. Two collections, one from Darwin, identified by Lloyd, show the upper surface as described. The specimens are rather small and more or less hoof-shaped and the spores in one 7 x 5 μ.

302. **Fomes Tepperii** Lloyd. (After J. G. O. Tepper, for many years Entomologist to the South Australian Museum, an assiduous collector of plants as well as insects).—"Pileus ungulate, with black, rimose surface. Context dark brown (Russet). Pores large, long, seemingly not stratified, setae none. Subhymenial cells forming a thick layer. Spores are many, subhyaline, 6 to 7 μ, globose; few are deeply coloured, same size and shape."—Lloyd. This species was presumably collected by Tepper and if so almost certainly in South Australia. A specimen from Baan Baa, New South Wales, collected in January, 1917, growing on *Acacia Cheelii*, was identified by Lloyd as this species. It formed a small bracket with a dark rimose upper surface; very long tubes (up to 1in., 2.5 cm.); orifices 2, sometimes 3, in 1 mm.; the context and tubes Russet (XV.) passing to Verona Brown (XXIX.); spores numerous, irregularly oval to irregularly polygonal, pale yellowish-brown, 7.8 to 8.5 x 6 μ.

303. **Fomes Lloydii** Clel. (After C. G. Lloyd, the well-known American mycologist, who recognised the species as new).—Pileus more or less ungulate, 4in. x 4in. x 2in. thick (10 x 10 x 5 cm.). Upper surface irregularly convex, more or less nodulose with a tendency to form small subsidiary pore-bearing ledges, velvety, Buckthorn Brown (XV.) and paler or darker. Pore surface more or less horizontal, tubes up to ½in. (1.2 cm.), orifices about 4 in 1 mm., Buckthorn Brown to Dresden Brown (XV.), young portions and growing edge near Yellow Ochre (XV.) giving the appearance of a border to portions that are spreading over the substratum. Context hard but not heavy, brighter yellow than Yellow Ochre (XV.). Spores very abundant, subspherical, brown, 4 to 4.8 μ. No setae. South Australia—On *Eucalyptus rostrata* Schl., National Park. August.

304. **Fomes Yucatensis** Murrill. (After the State of Yucatan, in Mexico).—C. G. Lloyd describes this species as being in every particular similar to *F. rimosus* except in possessing setae. He places both species under subsections with a light brown context, and under *F. rimosus* describes this colour as Raw Sienna. The context in Australian specimens of *F. rimosus* we find is usually a

little darker, namely, Ochraceous Tawny (XV.). Specimens from Dorrigo, New South Wales, identified by Lloyd, have a context near Sudan Brown (III.) which is a little darker again and the same colour as Lloyd gives for *F. senex* Mont., which is placed under his subsection with dark brown context. The orifices of the pores of the Dorrigo specimens are 4 to 5 in 1 mm., whereas in our *F. rimosus* they are usually 2 to 3. The spores are subspherical, dark brown, 4 to 5 μ; the setae acuminate with dilated bases, dark brown, 34 to 50 x 8.5 μ. The rimose appearance of the upper surface is not marked.

A large distorted hoof-shaped specimen from Kuitpo, South Australia, October, Lloyd suggests may be *F. Yucatensis*. It has a dark brown rimose upper surface, with a concave pore surface as in *F. conchatus*, but is thick (4in. x 2½in. thick x 4½in. high, 10 x 6.2 x 11.2 cm.). The context is near Sudan Brown (III.); the pore orifices 4 in 1 mm.; spores subspherical to oval, white, slightly coloured or occasionally decidedly brown; setae acuminate, ventricose, sometimes stalked, brown.

305. **Fomes senex** Mont. (L., *senex*, old, wrinkled).—C. G. Lloyd describes this species as being applanate, sometimes quite large, with a brown rugulose surface without a distinct crust; the context Sudan Brown; the pore mouths very minute, darker brown than the context, soft to the touch; setae very abundant, rather short and thick, 12 to 14 μ; spores globose, deeply coloured probably hyaline when young. Dr. G. H. Cunningham recognises *F. zelandicus* Cooke with hyaline spores as distinct. Specimens from Invercargill, New Zealand, June, were identified by C. G. Lloyd as Polyporus forms of *F. senex*, though Cunningham considers them as *F. zelandicus*. I found the context near Ochraceous Tawny (XV.), the pore surface near Cinnamon Brown (XV.), orifices about 5 in 1 mm., subspherical brown spores 4.8 x 3.2 μ, and numerous acuminate brown setae with ventricose bases, 24 to 32 x 6.5 to 8 μ.

A description of *F. senex* is included here for comparison with Australian plants referred to *F. Yucatensis*. The chief points of difference seem to be the applanate shape of *F. senex* compared with the more or less hoof-shape of *F. Yucatensis*, the wrinkled surface of the former as against a rimose crust and the darker pore surface velutinate to the touch in *F. senex*. The context colour is also perhaps darker in *F. senex*.

306. **Fomes lividus** Kalchb. (L., *lividus*, livid).—Forming extensive patches up to 20 x 9 cm., with the edge usually sharply defined. Pores minute, about 0.16 mm. wide, about 6 in 1 mm., pore layer 3 to 7 mm. deep. Hymenial surface when young near putty colour or greyer, or darker and greyer than flesh colour; when older, becoming near Fuscous (XLVII.), passing into Drab (XLVI.), and thence to the paler edge; when very old, sometimes blackish fuscous on which fresh patches of the greyish putty-coloured younger growth may appear. Tubes near Drab or darker or more fuscous than Natal Brown (XL.), sometimes showing grey tints. Context purplish fuscous, very thin, 1 to 1.5 mm., firm-floccose like compressed cotton-wool, sometimes appearing beyond the hymenial area as a dark livid brown scorched-looking sloping edge. Hyphae microscopically of a rather livid fuscous brown, a little irregular, 2 to 5.5, usually about 3.5 μ, thick. Spores white, subspherical to irregularly oval or rather quadrilateral, 5 x 3.5 μ.

Queensland. New South Wales. Not yet recorded for South Australia. January to March, June, August to November.

Our Australian specimens form effused drab to fuscous patches without any obvious bracket formation, thus resembling a *Poria*. A stratose arrangement of the tubes is not very obvious.

307. **Fomes hemitephrus** Berk. (Gr., *hemisus*, half; *tephra*, ashes, presumably from the upper surface having a cinereous tinge in places).—Pileus up to 4 to 5in. (10 to 12.5 cm.) or more laterally x 2½in. (6.2 cm.), up to 1½in. (3.7 cm.) thick in the middle, dimidiate to hoof-shaped or sometimes as rather applanate brackets, more or less decurrent at the attachment and sometimes almost entirely decurrent, surface dull with a hard sublaccate crust, usually with a brownish-orange tint below the crust, somewhat concentrically sulcate and zoned towards the edge, Smoke Gray (XLVI.) and paler to Snuff Brown (XXIX.) in the older portion, passing through Drab (XLVI.) to dark brown (Bister, XXIX.) towards the rounded edge. Pore surface and context Pinkish Buff to Cinnamon Buff (XXIX.); tubes up to 1.5 cm., imperfectly stratified; orifices very minute, about 6 in 1 mm. Spores white. New South Wales. New Zealand.

This species has not yet been recorded from South Australia though it may occur here. It is characterised by being usually more or less hoof-shaped, and having the upper surface grey to dark brown, more or less zoned and sulcate, a crust which may be somewhat laccate and usually shows a brownish-orange tint in the underlying context, the context yellowish-isabelline (C. G. Lloyd) to Pinkish Buff or Cinnamon Buff, and minute pores. Apparently it resembles *F. hornodermus* Mont., which, according to Lloyd, never has the orange tint under the crust, is more applanate and has context and pore surface white when fresh but tending to become fuliginous in spots and, in the case of the context, sometimes quite dark.

b. Receptacle stipitate or sessile, with a more or less laccate crust. Spores coloured, truncate at the base.

GANODERMA (Karst.) Pat.

(Gr., *ganos*, shining; *derma*, skin.)

"Pileus corky, stipitate or sessile, covered with a resinous, laccate crust. Stem lateral, rarely central, or none. Tubes heterogeneous, often stratose. Flesh coloured. Spores coloured, elliptical, ovate oblong or obovate, truncate at the base, smooth, punctate, verrucose or echinulate, thick-walled. Cystidia none or rare. Annual or perennial. Growing on wood, rarely on the ground."—Rea.

The genus *Ganoderma* is characterised by the laccate crust and the coloured truncate spores. The sometimes very large species *G. applanatum* is not common in South Australia as it is at the bases of trunks in the rain-forests of the Eastern States. The species that we have described as *G. polymorphum* was found in a very unexpected locality for a member of this genus, namely, the very dry north-west of the State; it was found growing on the timber down a well so that it had, even in this dry locality, moisture as well as warmth for its development; the finger-like appearance presented by many of the abortive fructifications is due to the situation in which the plants grew and is paralleled elsewhere, as in mines, by similar finger-like growths of *G. lucidum*. *G. lucidum* (Leyss.) Karst., recorded from Queensland and Tasmania, is a very handsome stalked species with a polished strongly laccate pileus and stem, the stem being usually lateral but sometimes central. In New South Wales, a sessile form related to *G. lucidum* is found, with a dark polished surface, which Lloyd refers to *G. sessilis* Murrill.

KEY TO THE SPECIES.

Sessile.

Context chestnut umber.

Very large, up to 8 x 3in. usually applanate, not heavy, with laccate brown crust. Spores brown, verrucose, truncate, 10 to 11 x 7.5 μ. 308. *Ganoderma applanatum.*

With a lateral stem.

Context sayal brown, snuff brown and pinkish buff.

Often deformed and digitate. Crust hard, laccate in places, Rood's brown to Vandyke brown. Spores brown, verrucose, truncate, 10 x 6.5 μ . . . . . 309. *G. polymorphum.*

308. **Ganoderma applanatum** (Pers.) Pat. (L., *applanatus*, flattened).—Pileus applanate, ungulate or irregular, up to 21in. laterally x 8in. from before backwards x 3in. thick (52.5 x 20 x 7.5 cm.) or larger (in more tropical parts), surface dull with a hard firm crust, often very irregular or even nodular, sometimes sulcately zoned, near Rood's Brown (XXVIII.), edge somewhat rounded and subtomentose, laterally attached over a considerable area but usually not for the whole of the lateral extent, occasionally substipitate. Context relatively rather light in weight, firm-corky, tough to cut, occupying about one-third to more than half the thickness, sometimes with layers of crust-like inclusions, near Auburn (II.) or darker. Tubes 1 to 5 cm. long, obscurely stratose, near

Bistre (XXIX.), dissepiments rounded, about the diameter of the tubes. Spores elliptical, sometimes truncate, with the epispore prominent at one end, verrucose, brown, 10 to 11 x 7.5 μ. South Australia—On an old pepper-tree, *Schinus Molle* L., Burnside; National Park; at the base of a pear-tree (*Pyrus communis* L.), Hall's Creek, Encounter Bay. New South Wales. Victoria. Tasmania. Europe, etc. Perennial.

This species, which may reach a very large size, is found near the bases of living trees or stumps and can be recognised by the brown somewhat laccate crust, the rich chocolate or umber-coloured context, and tubes which may be relatively short or two inches long. Dr. G. H. Cunningham, in New Zealand, distinguishes between *G. applanatum* and *G. australe* (Fr.) Cooke by the tubes being 0.18 to 0.2 mm. in diameter in the former and 0.27 to 0.3 mm. in the latter.

309. **Ganoderma polymorphum** Clel. (Gr., *polys*, many; *morphe*, shape).—Sporophores and abortive sporophores more or less grotesquely shaped, from nodular finger-shaped to lobed fan-shaped, with short or long lateral stems, the abnormal appearances being attributable to the situation in which the fungi had developed, namely on timber in the relative darkness 30ft. down a well. The more mature and normal forms show an upper surface which is 6in. laterally x 4in. (15 x 10 cm.) in size in the largest example and 4 x 2½in. (10 x 6.2 cm.) in a smaller one, irregularly plane to convex, obscurely concentrically sulcate, irregularly rugose, with a hard crust between Rood's Brown and Vandyke Brown (XXVIII.), much like that of *G. applanatum*, showing no laccate appearance or merely in places a trace of this, the edge rounded, deeply or only slightly irregularly lobed. The crust of the upper surface is continued on to the under-surface of the sporophore as a laccate rim, Chocolate (XXVIII.) in colour, up to ½in. (1.2 cm.) wide. The tube-bearing portion is borne on a downward-projecting horizontal platform, up to 5 mm. deep on the remaining under surface, the side of the platform being laccate, sulcately zoned and chocolate in colour like the rim. Tubes 8 to 9 mm. deep, seated on an undulating or plane basis, near Avellaneus (XL.) to Pinkish Buff (XXIX.), orifices Pale Pinkish Buff (XXIX.), 4 to 5 in 1 mm., rounded, dissepiments in thickness about the diameter of the orifices. Context 3 to 8 mm., firm-corky, zoned in paler and deeper shades, Sayal Brown (XXIX.) and paler, Snuff Brown (XXIX.) and Pinkish Buff, the whole fungus very light in weight. Stem lateral, short and thick (1in. x ¾in., 2.5 x 1.8 cm., to 3in. x ⅝in., 7.5 x 1 cm.), in the larger specimens very irregular and gouty-nodular, strongly laccate, brown like the crust to very dark brown. Spores broadly pear-shaped, one end truncate, warty, brown, 10 to 10.5 x 6.5 to 7.5 μ. Hyphae barely tinted.

Abortive sporophores are up to 7in. (17.5 cm.) long, consisting of a cylindrical laccate blackish brown stalk with podagriform (gouty) swellings, 3in. (7.5 cm.) or more long, ¼in. (6 mm.) or more thick, furcately dividing 4 or 5 times to form approximated podagriform branches of varying thicknesses, passing into the brown of the crust and ending in pallid club-shaped extremities. Here and there on the under-side of broadly flattened branches, tubes may develop on the usual platforms.

South Australia—On well timber 30ft. down, Moorilyanna, near the Everard Ranges, north-west of South Australia.

B. Tubes not in strata.

a. Tubes at proximal ends even.

1. Fleshy firm, relatively thick. Tubes forming a layer distinct from the substance of the pileus.

POLYPORUS (Micheli) Fr.

(Gr., *polys*, many; *poros*, a pore.)

"Pileus fleshy, cheesy, coriaceous or corky, often at length becoming hard with age; entire, lobed, excentric or dimidiate, simple or branched. Stem central, lateral or none, simple or branched. Tubes homogeneous or heterogeneous, long or short; orifice of pores round, angular, entire, torn or toothed. Flesh white

or coloured. Spores white or coloured, elliptical, pip-shaped, globose, subglobose, pruniform, oblong or elliptic fusiform; smooth, punctate or verrucose. Cystidia present or absent, hyaline or coloured. Annual or perennial. Growing on wood or on the ground; solitary, caespitose, imbricate or connate at the base.''—Rea.

The genus *Polyporus* comprises a large number of annual species of polypores, stalked or sessile, of a fleshy-firm to corky texture, the tubes forming a layer distinct from the substance of the pileus. Amongst Australian species are some very remarkable ones, such as the fungus known as ''Blackfellow's Bread'' and other related species which possess large underground tuber-like structures, sometimes intermixed with sand, from which after rains the stalked fruiting-bodies develop. Other species, such as *P. Colensoi* and *P. anthracophilus*, consist of masses of branching stems bearing pilei, and may be found at the bases of some of our Eucalypts. *P. eucalyptorum* is a large sessile species growing high up on the trunks of gum trees.

KEY TO THE SPECIES OF *POLYPORUS*, *POLYSTICTUS*, AND *TRAMETES*.

STIPITATE SPECIES OF *POLYPORUS* AND *POLYSTICTUS*.

Stem single, more or less central.

Smallish, mostly thin, rarely with the pileus an inch (2.5 cm.) across.

Growing on the ground.

Colour near cinnamon, pileus radiately fibrillose, plano-depressed .. .. 331. *Polystictus oblectans.*

Warm buff to clay colour, pileus often deeply depressed, edge often fimbriate .. .. 310. *Polyporus arcularius.*

Dusky drab to dark brown, rarely pallid. Stem blackish, villose .. .. 311. *Polyporus melanopus.*

On trunks of trees or fallen wood.

Small, rarely ½in., whitish. Stem excentric, short, arising from the under surface .. .. 312. *Polyporus rhipidium.*

Pileus 2 to 3 mm., pale snuff colour below the whitish bloom. Stem curved, short, arising from the upper surface. Under surface disc shaped .. .. .. 313. *Polyporus pocula.*

Large, on the ground, with a true or false sclerotium.

Pileus brown to cinnamon buff, hard, pitted, with true and false sclerotia .. .. 314. *Polyporus basilapiloides.*

Pileus whitish with egg-yolk colour in centre, with a large true sclerotium (''Blackfellow's Bread'') .. .. 315. *Polyporus mylittae.*

Pileus with umber cuticle. Flesh white, not hard. Stem short. In burnt country, with false sclerotium .. .. 316. *Polyporus tumulosus.*

Large, on trunks or at bases of trees.

Often deformed, pileus ochraceous tawny to brown. Tubes becoming brown with a greenish-yellow glint. Stem usually excentric, irregular, ochraceous tawny. At bases of trees .. .. 317. *Polyporus Schweinitzii.*

Deformed, pileus usually ill-defined, buff to vinaceous fawn. Tubes daedaloid. Contex near pinkish buff. Stem-like base ill-defined. At bases of trees .. .. 346. *Daedalia biennis* (*Polyporus rufescens*).

Pilei sometimes several, superimposed, rich brown, velvety, fleshy. Tubes shallow, creamy white. Stem dark brown. On trunks .. .. 318. *Polyporus Hartmanni.*

Stem and pilei multiple, usually large.

Branching stems and pilei forming a fleshy-tough mass up to foot in diameter. Pilei umber to sepia. Pores pinkish buff to vinaceous cinnamon. Spores smooth, 5.5 x 3.5 μ. At bases of Eucalypts .. .. 319. *Polyporus Colensoi*

Forming a hard, often rosette-like, mass .. .. .. 320. *Polyporus anthracophilus.*

SESSILE SPECIES OF *POLYSTICTUS*—PILEI THIN.

Pileus beautifully zoned in greys and browns, velvety pubescent. Common .. .. 332. *Polystictus versicolor.*

Similar but more robust and strongly hirsute .. .. .. (*vide* 332). *Polystictus hirsutus.*

Pileus pallid to cinnamon buff, greyish to dark brown in older parts, strigose. Tubes often irpiciform, sometimes long, bister often with a purplish tint .. 333. *Polystictus versatilis.*

Pileoli small, imbricate, growing edge velvety and dark brown, older portion with white investiture. Pores brown with purplish cast .. .. 334. *Polystictus albo-vestidus.*

SESSILE SPECIES OF *POLYPORUS* AND *TRAMETES.*

Context white.

Large, fleshy-punky. Cuticle smoky brown. Pores when fresh brilliant yellow. High up on Eucalypts .. .. 321. *Polyporus eucalyptorum.*

Large, whitish becoming buff when old, corky. Surface soft. Tubes to $\frac{3}{4}$in. long. Orifices 0.5 mm. .. .. 337. *Trametes lactinea.*

Thin, soft, forming extensive patches often mostly resupinate under logs. Pileus pallid. Pore-surface cinnamon to purplish brown .. .. .. 383. *Polyporus (Glocoporus) dichrous.*

Context woody-buff to darker than pinkish buff.

Hoof to bracket shaped, up to 2 x 1$\frac{1}{2}$in. Pileus yellowish-brown. Spores truncate, 12 to 19 x 6.5 to 9 μ. Usually on fences .. .. 338. *Trametes ochroleuca.*

Small hoof-shaped brackets to 2 cm. Pileus rough, dark brown to blackish. Pores shallow, 0.5 to 1 mm. diameter, pinkish buff .. .. 340. *T. epitephra.*

Context orange or scarlet

Large. Context deeply stained by orange-red juice and not radiately fibrillose. Smell aromatic. Cuticle creamy white. Tubes orange .. .. .. 322. *Polyporus australiensis.*

Often deformed, rather brittle, orange-rufous. Context radiately fibrillose. Tubes pallid to tawny olive .. .. 323. *Polyporus lateritius.*

Firm scarlet brackets. Common .. .. 335. *Trametes cinnabarina.*

Context vinaceous.

General colour brownish-lilac. Pore surface Hydrangeia-pink .. .. 336. *Trametes lilacino-gilva.*

Context ochraceous salmon to russet.
Brackets fleshy when fresh, up to 4¼ x 3in. Pileus brown, villose to hispid. Pores pallid turning brown. On Eucalypt trunks .. .. 324. *Polyporus pelles.*

Context olive brown to sayal brown and snuff brown.
Forming thin brackets, descending behind. Pileus velvety to very rough, pinkish buff to pallid buffy brown. Tubes near drab .. .. 339. *Trametes protea.*

Context brown to gilvous.
Spores hyaline.
Large (8in.), firm. Crust pale, glabrous. Tubes 1.5 cm. long. No setae. Spores hyaline, 4 μ .. .. 325. *Polyporus Victoriensis.*

Hoof-shaped, triangular in section, 3in. across. Crust ochraceous tawny. Hymenial surface descending, convex, brown with glaucescence. No setae (in Australian plants). On living Eucalypts .. .. 326. *Polyporus dryadeus.*

More or less bracket-shaped, 3in. or more laterally, ½in. thick. Pileus snuff brown, granular to strigose. Context bright gilvous. Hymenial surface horizontal, snuff brown. Setae usually abundant. On dead wood .. 327. *Polyporus gilvus.*

Forming minute brackets, usually on a resupinate surface, Brussels brown. Setae prominent .. .. 328. *Polyporus subcontigua.*

Spores brown.
Often large, applanate, ½ to 1in. thick. Pileus tomentose becoming smooth, warm sepia. Tubes to 1 cm., snuff brown, orifices 4 in 1 mm. Context sayal brown to warm sepia. Setae none or few .. .. 329. *P. Ludovicianus.*

Thicker, rather applanate. Pileus smooth. Orifices 2 to 3 in 1 mm. Context Brussels brown with satiny sheen. Acuminate setae.. 330. *P. Patouillardii.*

A. Stipitate species.

310. **Polyporus arcularius** (Batsch) Fr. (L., *arcula*, a casket).—Stipitate with a slender more or less central stem. Pileus up to 1¼in. (3.1 cm.), thin, convex with the centre often deeply depressed and hole-like, smooth, with the edge in-turned and sometimes fimbriate, near Warm Buff (XV.) or near Clay Colour (XXIX.). Hymenial surface pallid brownish (near Cinnamon Buff, XXIX., becoming when old darker than Verona Brown, XXIX.; near Clay Colour, XXIX.), pore orifices rather large (nearly 1 mm. diameter), somewhat decurrent, angular, dissepiments thin, tubes up to 4 mm. deep. Stem about ¾in. (18.5 mm.), slender, subfibrillose, brown. Flesh very thin, about 1 mm. Spores 6 to 8 x 3.2 μ. South Australia—Mount MacIntyre (S.E.). New South Wales. Victoria. December.

311. **Polyporus melanopus** (Swartz) Fr. (Syn. *P. Pancheri*, Pat.) (Gr., *melas*, black; *pous*, a foot).—Stipitate, rarely spathulate. Pileus up to 1½in. (3.7 cm.), convex with the centre depressed, innately strigose becoming smooth, Dusky Drab (XLV.) to dark brown, rarely very pallid (darker and browner than Pinkish Buff, XXIX), occasionally zoned (Chocolate, XXVII., in zones, greyish between). Hymenial surface pallid greyish buff, near Avellaneous (XL.) or Pinkish Buff (XXIX.), deeply decurrent on the stem, orifices minute, 4 to 5 in 1 mm., angular, dissepiments thin, tubes 1 to 1.5 mm. deep, at first very shallow. Stem 1in. (2.5 cm.) or more, ⅜in. (9 mm.) thick, central or sometimes excentric, sometimes flattened, often irregular, villous and dark fuscous brown or blackish at the base. Context paler than Pinkish Buff (XXIX.), 2 mm. or more thick. Spores 5.2 to 9 x 2.5 to 3.7 μ. On the ground, sometimes attached to rotting wood. South Australia—Mount Lofty Range, The Meadows. New South Wales. June, August.

This species grows on the ground and can often be traced to underlying buried pieces of rotting wood or sticks. The pileus is drab to chocolate, occasionally pallid, and the stem, at least at the base, is minutely velvety and fuscous brown to black. In *P. melanopus*, the pileus is at first innately strigose to pruinose; in *P. picipes* Fr. and *P. varius* Fr., which also have black stems, both pileus and stem are glabrous.

312. **Polyporus rhipidium** Berk. (as **Favolus**). (Perhaps from Gr., *rhipis, rhipidos*, a bellows).—Pileus convex, 3 to 5 mm. broad, minutely tomentose, about 1 mm. thick, whitish becoming Clay Colour (XXII.) when dry and edge incurving. Orifices about 3 in 1 mm., rounded or slightly radiately elongated,

[*Photo. by S. Tee.*

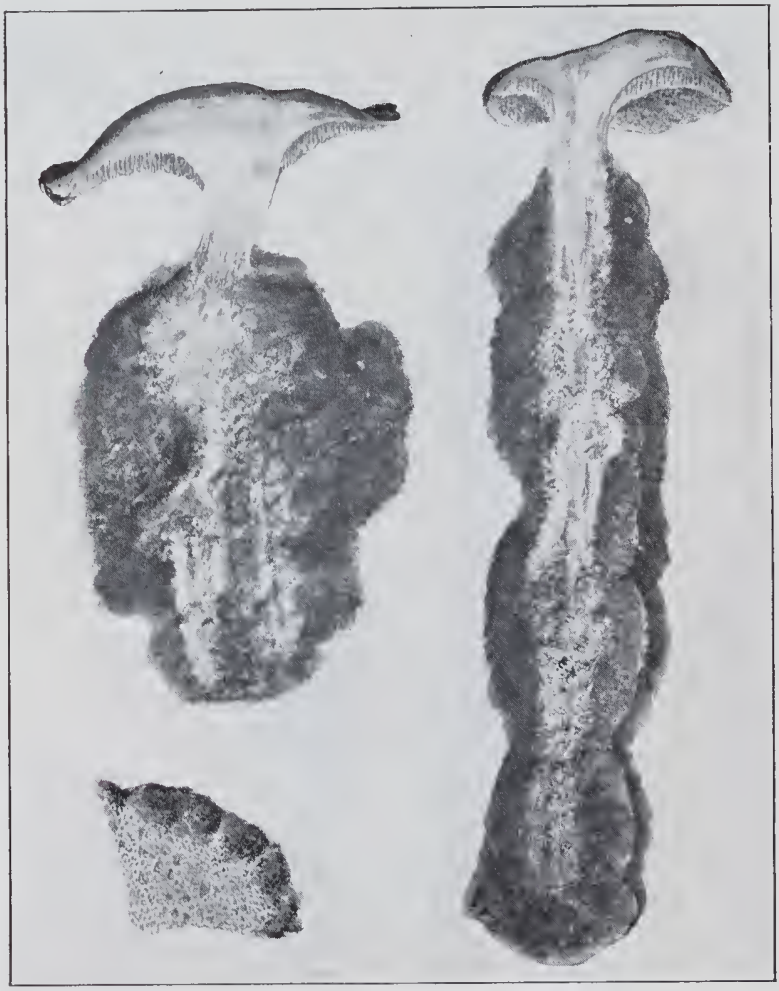
Figure 43.—*Polyporus pocula* **Schw. (No. 313). Kuitpo.**

dissepiments rounded in thickness about half the diameter of the orifices, tubes about 0.5 mm. thick, half the thickness of the pileus. Stem lateral, minutely tomentose, 1 to 2 mm. long. On dead bark and rotting wood. Spores 4.4 to 5.2 x 2 to 2.5 μ. South Australia—Mount Lofty. New South Wales. Queensland. Victoria. April, July.

This is a neat-looking very small species, $\frac{1}{8}$ to $\frac{1}{5}$in. in size, whitish becoming buff-tinted, with a lateral stem, found usually in considerable numbers on old wood or trunks.

313. **Polyporus pocula** Schw. (Syn., *P. cupuliformis* B. et C.) (L., *poculum*, a cup or drinking pot).—Pileus $\frac{1}{5}$ to $\frac{1}{3}$in. (5 to 8 mm.) laterally x 4 to 7 mm., 2 mm. thick, convex, pliant, brownish grey to Clove Brown (XL.) with a hoary granular bloom becoming very marked on drying and then cracking rimosely. Stem curved, 2 mm. long, 0.6 to 1 mm. wide, attached near one side of the

convex upper surface. Under surface disc-shaped with slightly raised rounded rim, pore orifices very minute, rounded, about 6 in 1 mm., dissepiments rounded, tubes about 0.7 mm. deep, tubes and orifices near Avellaneous (XL.). Substance thin, about 0.5 mm., near Buff Brown (XL.). Spores ? subspherical, 4.5 μ. South Australia—Encounter Bay. Kuitpo. March. (Figure 43.)



[*From watercolours by Miss Fiveash.*

Figure 44.—*Polyporus basilapiloides* **(McAlp. et Tepper). (No. 314).** Sections showing underground stem passing into a false sclerotium, with true sclerotium at base on right. Also under surface of pileus, showing pores. Reduced by more than $\frac{1}{3}$.

This minute brownish-grey species is more particularly characterised by the curved stem being attached near one side of the upper surface.

314. **Polyporus basilapiloides** (McAlp. et Tepper) (Syn., *Laccocephalum basilapiloides* McAlp. et Tepper) (L., *basis*, the base; *lapis*, a stone, with the Greek ending *oides*, signifying like—in reference to the stone-like false sclerotium).—Pileus convex, up to 5in. (12.5 cm.), the centre shallowly pitted by raised brown lines, the depressions paler, the pitting sometimes little marked,

[*Watercolours by Miss P. Clarke (Fig. 1) and Miss Fiveash (Figs. 2, 3, and 4.)*

PLATE VIII.

Figure 1. *Mutinus borneensis* **Cesati** (*Jansia rugosa* **Penz.**) **(No. 437A.) Sydney. x 2.**

Figure 2. *Polyporus basilapiloides* **McAlp. et Tepper (No. 314), with upper surface of pileus. Monarto South. Reduced by 1/3.**

Figure 3. *Mycena epipterygia* **Scop. (No. 78). Mount Lofty. Reduced by 1/3.**

Figure 4. *Clavaria vinaceo-cervina* **Clel. (No. 428). (Originally figured as** *C. cinerea* **Fr.) Mount Lofty. Reduced by 1/3.**

[From Transactions, Royal Society of South Australia, XLVII., 1923, by permission.]

the lines being replaced by rugosities, edge of the pileus crinkled and irregular, firm, often very hard, Mikado Brown (XXIX.), Vinaceous Cinnamon (XXIX.) or near Cinnamon Buff, the edge near Cinnamon Orange (XXIX.). Pore orifices small, tubes up to ¼in. (6 mm.), adnate, shortened externally, whitish. Context tough, near Light Buff (XV.). Stem above ground short, ¾in. (1.8 cm.), ½in. (1.2 cm.) thick, concolorous with the pileus, smooth or reticulated, covered with sand, sometimes as a distinct stem passing down for an inch into the sand and mycelium; the stem is succeeded by irregular swollen masses, up to 3in. (7.5 cm.) in diameter with irregular constrictions and up to 6in. (15 cm.) long, composed of compacted mycelium and sand without a definite crust; below this false sclerotium is an irregularly rounded or elongated true sclerotium, up to 3¼ x 2¾in. (8 x 7 cm.) in size and weighing up to 12¾ozs., with an outer dark crust of mycelium and sand, on section somewhat moist, sticky, cutting like firm cheese, the colour of doughy brown bread, not showing "cells" as in *P. mylittae*. Weight of pileus with sclerotia up to 28ozs. Spores elongated, narrow, hyaline, 14 x 4.5 μ. On the ground in sandy soil, usually in mallee country, the sporophores usually appearing after bush fires. South Australia—Monarto South, Moorlands, Alawoona, Loxton, Lake Alexandrina, Balaklava, Broughton River in Spalding district, in a grotto in a creek at Aldgate, and South-East, Kangaroo Island (in burnt country at Lower Rocky River, near Kingscote), Koonibba (E.P.). Victoria (Mallee districts). New South Wales. May. August. (Figure 44 and Plate VIII., Figure 2.)

This is the famous "Stone-making Fungus" first described by McAlpine and Tepper. The "stone" is the hard false sclerotium of densely compacted mycelium and sand, from which underground store-house the fruiting body composed of pileus and stem emerges after autumn and winter rains. The species is quite common in the sandy soil of our mallee areas.

315. **Polyporus mylittae** Cooke et Massee. (From the supposed genus *Mylitta* of Fries, Berkeley in 1839 describing the sclerotium as *Mylitta australis*).—The subterranean sclerotium or "tuber" known as "Blackfellow's Bread" or "Native Bread," is the part of the fungus most likely to be met with, the sporophore (fruiting body, cap) having been rarely seen. The "Native Bread," turned up when digging or ploughing, is a heavy more or less rounded mass of densely compacted fungous mycelium without any soil or sand incorporated which may reach a large size (24½in., 60.6 cm. in diameter; 9 x 6 x 3in., 22.5 x 15 x 7.5 cm.; nearly 6lbs., and it has been said, 25¼ and even 39lbs. in weight). The outer surface is a dark earthy brown due to a thin rough crust which may flake off a little with age. The sclerotium is when found usually very hard to cut. Section reveals an obscure alveolar appearance, the alveoli being about ⅛ x ¼in. (3 to 6 mm.), the septa whitish, the "contents" the colour of beeswax.

On several occasions now, after the "Blackfellow's Bread" has been gathered, sectioned and probably kept moist, pore-bearing fruiting bodies have developed. It seems doubtful whether any one has yet met with the caps developing under natural conditions. This sporophore is whitish with a smoky or biscuity tint, the pileus showing in its centre a citron yellow or lemon yellow colour tending to become tinted more the colour of yolk of egg. Pileus more or less plane or with the edge upturned, 3 to 5in. (7.5 to 12.5 cm.), smooth. Pores deeply decurrent on the stem, small, when well-developed 2½ to 3 in 1 mm., irregular, dissepiments thin, pores often lacerated and irregular and sometimes lrpex-like, tubes 2 mm. deep. Context white, punky and easily cut. Stem 1 to 1½in. (2.5 to 3.7 cm.), irregular, stout (up to ¾in., 18 mm.), expanding upwards into the pileus. Spores elongated, oblique, white, 6.5 x 2.5 μ. Some sporophores have a pear-shape, others are more mushroom like. The density of the sclerotium diminishes as the fruiting body develops, becoming quite light. South Australia—Sclerotia have been found at Myponga (about 2ft. underground near a gum tree in wet and sandy soil), Denial Bay district (about 10in. below the surface in mallee limestone), Honeysuckle Flat near Mypolonga and Moorlands (sclerotium atypical—perhaps of an allied fungus). New South Wales. Victoria. Tasmania. Western Australia. (Plate VII. Plate IX., left-hand figure.)

[315A. **Polyporus minor-mylittae** Clel. et Cheel. (L., *minor*, less, smaller; *mylittae*, in reference to *P. mylittae*).—"Pileus 1¼ to 2⅖in. (3 to 7 cm.) with a sulcate, minutely tomentose surface, raw umber (brown). Flesh usually dry; subligneous, usually in two layers, each 1 to 3 mm. thick, the upper rich cream

to light brown, the lower white. Stipe mesopodial, ¾ to 2½in. (2 to 6 cm.) long, 5 to 15 mm. thick. Pores small, roundish or irregular, 2 to 3 mm. long. Spores abundant, cylindrical, smooth, hyaline, 6 x 2 μ.''—Lloyd. New South Wales. Not yet recorded for South Australia. (Plate IX. Right-hand figure.)]

316. **Polyporus tumulosus** Cooke (L., *tumulosus*, bearing a hillock or lump).—In sandy *Eucalyptus* forest land which has been recently burnt, a *Polyporus* has been found in New South Wales, South Australia, and Tasmania after late summer or autumnal rains, even when mere sprinkling, which we attribute to this species originally described from Queensland. We have only found specimens in country which has been recently burnt but on such areas the fruiting bodies rapidly emerge after the rain, appearing within a fortnight of the burn and consequently less since the rain. The pileus emerges from a false sclerotium of mycelium-impregnated sand, roughly delimited by a thin indefinite fragile blackish crust. It would seem as if, in the absence of fire, the mycelium over perhaps many years merely vegetates in the humus, laying up food-stores which are concentrated in the false sclerotium. For the latter to translate these into fruiting bodies (the stem and pileus bearing the spores), fire would appear to be necessary, either on account of the heat or more likely as the result of the potash and other salts and chemical substances set free by the blaze and carried down by the rain. The stem often only emerges above the ground for ½in. to 1in. (1.2 to 2.5 cm.), a longer portion (2in., 5 cm.) being buried and sand-incrusted. This is carried on for perhaps another 2in. (5 cm.) as mycelium-impregnated sand to end in the false sclerotium an inch (2.5 cm.) or considerably more in diameter. From the shortness of the stem above ground, the pilei are but little above the ground-level and are often dirt-bespattered. March and April.

South Australian specimens, collected on March 31 and April 1, 1929, in country burnt on March 12, followed a few days later by slight rain, near Blackwood Gully, Knitpo district, are described as follows:—Pileus 2 to 3in. (5 to 7.5 cm.), convex, rather irregular, edge sometimes with irregular bays, smooth, not apparently viscid when moist, with a cuticle which tends to crack, near Saccardo's Umber (XXIX.). Tubes 2 to 3 mm. long, slightly decurrent, dingy creamy white, sometimes becoming stained brownish when old, orifices rather irregular, about 1½ in 1 mm., dissepiments thin, somewhat compressed, wanting in places. Stem central, ½ to 2in. (1.2 to 5 cm.) above ground, about 1in. (2.5 cm.) buried and sand-incrusted, moderately stout to stout (½ to 1in., 1.2 to 2.5 cm.), a little fibrillose, white, later sometimes with brownish stains, passing below into a core of mycelium and sand, leading to a false sclerotium, 1in. (2.5 cm.) or more in size, composed of sand and mycelium surrounded by a thin darker crust. Spores elongated, oblique, mummy-shaped, white, 10 to 15 x 5 to 6 μ, usually 13 x 5.5 μ. Specimens were also collected in burnt stringy-bark (*E. obliqua* L'Herit.) country at Mount Lofty on March 27, 1929.

317. **Polyporus Schweinitzii** Fr. (After Ludwig David von Schweinitz, an American mycologist).—Variable, often deformed, at the base of stumps, usually with an excentric or nearly lateral stem or stem-like attachment, rarely with the stem nearly central. Pileus up to 3 to 6in. (7.5 to 15 cm.), nearly plane or depressed in the centre, irregular, sometimes with deformed secondary pilei, rarely as a rosette, surface villous, irregularly rugose or coarsely tuberculur or lacerated, edge a little irregular or even lobed, often with incorporated leaves or grass-stems, becoming smooth when old, Tawny to Ochraceous Tawny (XV.) or sometimes near Raw Sienna (III.), the edge sometimes Cream Buff (XXX.) or pallid, when young Yellow Ochre (XV.) to Chamois (XXX.) and pale yellow, when old very dark brown. Hymenial surface concavo-convex, decurrent, often deeply so, on the stem, nearly vertical in young plants when their shape is that of an inverted cone, at first pallid whitish, passing through Warm Buff (XV.) to dark brown (Dresden Brown, XV.) with a yellowish or greenish-yellow glint; pore orifices minute, 3 to 5 in 1 mm., varying a little in size, often partly sealed, dissepiments thin; tubes 2 to 4 mm. deep, Tawny Olive (XXIX.) to glaucous brown. Context up to over 1in. (2.5 cm.) thick in the centre, tapering outwards, rather radiating, light in weight, tough, punky-firm, Ochraceous Tawny (XV.) to Cinnamon Brown near the base. Stem 1in. (2.5 cm.) or less to 2in. (5 cm.), stout (1in., 2.5 cm.) to rather slender, very irregular, often knobby and distorted, attenuated downwards, villous, near Yellow Ochre to Ochraceous Tawny and Cinnamon Brown (XV.). Spores subspherical to elliptical, white, 8 x 5 to 6.5 μ, 8 μ (in New South Wales specimens the spores are mostly smaller, 5.2 x 3.5 μ,

[*Watercolours by R. T. Baker (left) and Miss P. Clarke (right).*

PLATE IX.

Left—Sclerotium of *Polyporus mylittae* Cke. et Massee (No. 315). From the cut Surface an abortive Fruiting Body has developed. New South Wales.

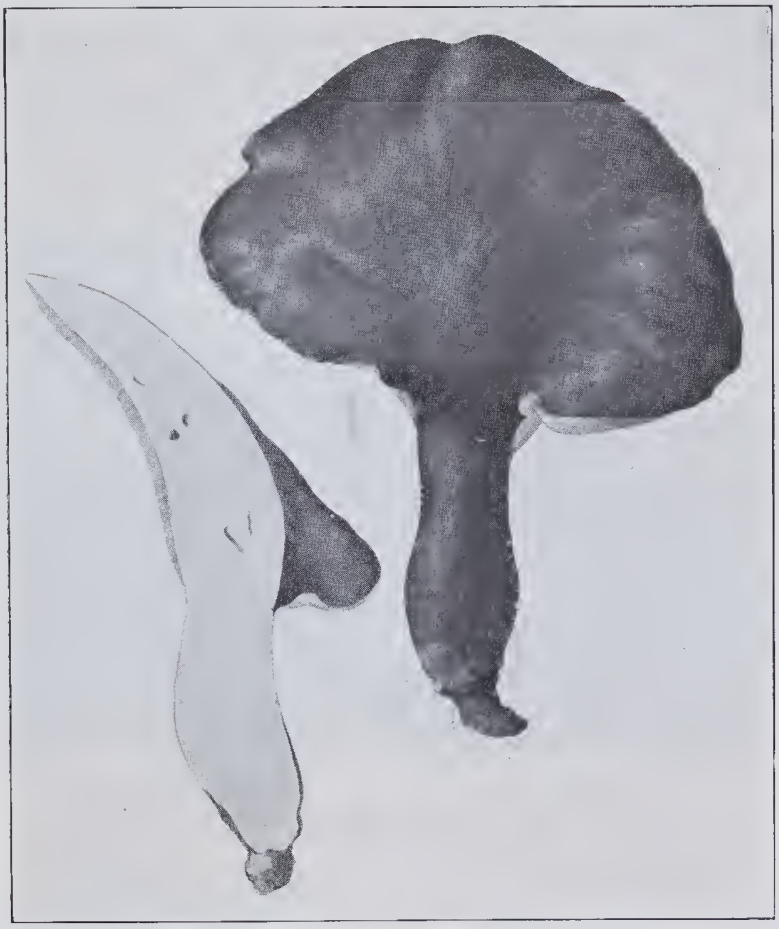
Right—*Polyporus minor-mylittae* Clel. et Cheel (No. 315A), showing rhizomorphs traversing the surrounding soil. The sclerotium has been absorbed to form the sporophore.

[From Transactions, Royal Society of South Australia, XLIII., 1919, by permission.]

5.2 μ, 3.5 μ). South Australia—At the base of *Eucalyptus obliqua* L'Herit., Kuitpo. New South Wales. May (in South Australia).

This is a rare species in South Australia but commoner in New South Wales.

318. **Polyporus Hartmanni** Cooke. (A surname).—This species is a thick fleshy polypore, usually about 3in. (7.5 cm.) in diameter, with a rich somewhat chestnut-brown, rather velvety pileus and a short thick dark brown, velvety excentric stem. The spores in specimens collected at Bulli Pass, New South Wales, were 7 to 8.5 x 3.5 μ. The species usually grows on the ground. (Figure 45.)



[*From watercolour by Miss P. Clarke.*

Figure 45.—*Polyporus Hartmanni* **Cooke. (No. 318). Kendall, New South Wales. Reduced by nearly $\frac{2}{3}$.**

A very large fleshy-tough *Polyporus*, weighing when fresh 5lbs. and measuring 12in. x 9in. x 8in. high (30 x 22.5 x 20 cm.), found growing about 12ft. up in the main fork of a large living Stringy-bark (*Eucalyptus obliqua* L'Herit.) at Blackwood Gully near Kuitpo Forest on March 31st, 1929, appears to belong to this species in spite of its large size and situation. Only a little light autumnal rain had fallen but this had probably collected in the fork thus enabling a spore to germinate in the dust and debris therein accumulated, food material doubtless corresponding to that in the usual habitat on the ground under Eucalypts. The specimen was roughly triangular, composed of several superimposed brackets, the largest above, united together and gradually con-

tracted downwards into a thick stem-like base, 5in. (12.5 cm.) long and 1¾in. (4.3 cm.) thick above. The upper surface of the pileus was irregular, convex in places, depressed in others, with a rather thick cuticle, velvety when young, tending when older to split with the edges turning up as large scales, the oldest part Vandyke Brown (XXVIII.), passing into a rich ferruginous tawny to ferruginous russet, the growing edge thick, rounded, somewhat nodular with shallow indentations, whitish in places to Antimony Yellow (XV.). Tubes up to 4 mm. deep, commencing as reticulations, 2 to 2½ in 1 mm., finally 2 to 3 in 1 mm.; orifices rather irregular, sometimes nearly triangular; dissepiments as thick as the orifices are wide, rounded, sometimes defective, tubes and orifices creamy white becoming irregularly discoloured brownish. Stem-like base where visible dark brown, velvety. Flesh very thick, up to 2½in. (6.2 cm.), fleshy firm when cut, white slowly turning pinkish brown then Russet (XV.), much channelled and discoloured by the boring of three species of beetles. Spores narrow, oblique, mummy shaped, white, 7 to 9 x 2.5 to 3.5 μ.

319. **Polyporus Colensoi** Berk. (After Rev. William Colenso, who arrived in New Zealand in 1834 and for 65 years was an indefatigable botanical collector there).—Very large, tough-fleshy, weighing sometimes over 7lbs. and measuring

[*Photo. by E. Rogers.*

Figure 46.—*Polyporus Colensoi* **Berk. (No. 319). National Park. Reduced to about ⅓.**

up to 13 x 11in. and 10in. high (32.5 x 27.5 x 25 cm.), growing near the bases of Eucalypts from a buried dry mass of felted mycelium and soil several inches in diameter. A broad knobby stem, up to 2in. (5 cm.) high and in places 1¼in. (3 cm.) thick, divides in a highly irregular manner to end eventually in numerous crowded, rather imbricate, irregularly flabelliform, irregularly lobed, lacerated and crisped pileoli. The upper surfaces of the pileoli are highly irregular, often with superimposed subsidiary pileoli, somewhat convex externally and sometimes concave to funnel-shaped towards the lateral attachment, smooth with a dull surface, smoky brown becoming blackish-brown towards the edge (Saccardo's Umber to Warm Sepia, XXIX., and darker). Hymenial surface Pinkish Buff (XXIX.), when old sometimes Light Vinaceous Cinnamon (XXIX.); pore orifices irregular, usually rather elongated laterally and about 2 x 0.5 mm., sometimes radially arranged and irregularly lenzitiform with cross-partitions, sometimes irpiciform; dissepiments thin with rounded edges, sometimes plate-like and lacerated, the smaller cross-partitions often defective with free ends; tubes up to 4 mm. deep. Context fleshy-tough, whitish. Spores subspherical, hyaline, smooth, 5.5 x 3.5 μ. On the ground at the bases of Eucalypts. South

Australia—National Park (at the base of *Eucalyptus viminalis* Labill.), Mount Lofty (at the base of *E. viminalis* Labill. or *E. rubida* Deane et Maid). New Zealand. May, June. (Figure 46.)

This is a very large, tough-fleshy, smoky brown species composed of densely crowded irregularly branching stems bearing pilei on their extremeties and found with us at the bases of Eucalypts. The closely-related *P. Berkeleyi* Fr., which has been found in New South Wales and New Zealand, has echinulate spores.

320. **Polyporus anthracophilus** Cooke. (Gr., *anthrax*, coal or charcoal; *philos*, loved).—Pileus 5 x 4in. (12.5 x 10 cm.) or more in size, compound, composed of numerous more or less fan-shaped pileoli arising from an excentric or lateral or sometimes central, short, irregular, broad stem-like base, when the attachment is central often with a rosette-like arrangement of the pileoli. Pileoli more or less fan-shaped, 1¼in. (3.1 cm.) laterally x 1½in. (3.7 cm.) long, sometimes much broader, fusing with neighbouring pileoli or more or less separated, shortly lobed, coarsely and irregularly radiately rugulose or rugose-tuberculate, minutely velutinate, near Sayal Brown (XXIX.) or dingy greyish white. Tubes decurrent,

[*Photo. by S. Tee.*

Figure 47.—*Polyporus anthracophilus* **Cooke (No. 320). National Park. Reduced to ½.**

2 to 5 mm. long, orifices about 3 to 4 in 1 mm., irregular, sometimes labyrinthiform, dissepiments thin, sometimes torn, dingy Pinkish to Pale Pinkish Buff (XXIX.). Context hard, thin, 0.4 mm. in outer pileoli, Pale Pinkish Buff (XXIX.). Substance of whole plant hard. Spores elliptical, oblique, hyaline, smooth, 5.5 to 8 x 3.7 μ with a yellowish gutta. On stumps. South Australia—National Park. New South Wales. Victoria. June. (Figure 47.)

This, like *P. Colensoi*, has also a compound structure with many pileoli but the substance is hard and not fleshy-firm. It may assume a rosette shape. It grows on stumps.

321. **Polyporus eucalyptorum** Fr. (*Eucalyptorum*, of Eucalyptus trees).—Large, a moderate-sized specimen measuring 8in. (20 cm.) laterally, 9in. (22.5 cm.) from before backwards, and 6in. (15 cm.) vertically at its attachment to the trunk and weighing when fresh 3lbs. 1oz., but considerably larger specimens occur. Thus a bracket from Inman Valley measured 18in. (45 cm.) laterally, 10in. (25 cm.) antero-posteriorly and 7in. (17.5 cm.) in height. Another specimen weighed 9¼lbs. Hoof-shaped, sometimes splayed out below or in other cases laterally extended, rarely somewhat applanate. The upper surface of the pileus is brownish, in places smoky brown, from the thin cuticle which peels with

difficulty and is finely punctate, sometimes prainose and near the edge finely reticulated from raised lines. Hymenial surface slightly convex, when fresh of a beautiful canary yellow colour, when old the pore layer thin with the tubes up to 10 mm. long, the pore orifices minute and not or barely visible to the naked eye, in the younger parts like pin-pricks or pin-slits separated widely by the dissepiments, near the edge becoming larger and more irregular, the slits rarely giving rise to almost a lamellar condition approaching gills. Flesh pure white, soft yet firm, punky when dry. Spores subglobose, smooth, white, 8 to 10 x 6 to 8.5 μ. Penetrating mycelium white. On trunks of living or rarely dead Eucalypts, sometimes only a few feet from the ground, usually about 10ft. up, sometimes as high as 30 or 40ft. up, found once on a Sheoak (probably *Casuarina stricta* Ait.). In South Australia, the species of Eucalypts known to be affected are *Eucalyptus Baxteri* (Benth.) Maiden et Blak., *E. obliqua* L'Herit., *E. viminalis* Labill., *E. rostrata* Schl., *E. leucoxylon* F.v.M., and *E. elaeophora* F.v.M. South Australia—Waterfall Gully, Mount Lofty, Kersbrook, National Park, Kuitpo, Myponga, near Yankalilla, Inman Valley, Hindmarsh Tiers, Angaston, Mount Remarkable (on box gum). January, May, June, October.

322. **Polyporus australiensis** Wakefield. (*Australiensis*, Australian).—Up to 5½in. (13.7 cm.) laterally, 3½in. (8.7 cm.) from before backwards, 2½in. (6.2 cm.) vertically at its attachment and 1½in. (3.7 cm.) in the centre, sometimes hoof-shaped, often deformed, laterally attached throughout, upper surface convex with irregular depressions, cuticle innately villous, nearly smooth, creamy white, apt to be stained rusty orange by the pigmented juice from the context. Hymenial surface deeply convex to plane or concave, rusty orange to brownish orange when old, pore orifices rather irregular, 1 to 1.5 mm. wide, dissepiments thin, pores rather shallow, up to about 2 mm. deep. Context rather light, punky-firm, cream-coloured, extensively pigmented with the rusty orange juice. Exuding when fresh an orange-yellow dye. Characterised by a peculiar musty-aromatic scent. Spores were not found by Miss Wakefield in the type nor in our South Australian specimens; in a specimen from the Nattai River, New South Wales, we found globose, smooth, colourless spores about 3 μ which we believed to belong to this species. South Australia—On fallen logs, Stunsail-Boom River and Rocky River, K.I.; on under-side of log, Willunga Hill; on stump, Kuitpo. Victoria. New South Wales. Queensland. Tasmania. Flinders Island (Bass Sts.). Western Australia. March, May.

This is a very striking and readily recognised species, characterised by the general orange-yellow pigmentation.

323. **Polyporus lateritius** Lloyd. (L., *lateritius*, made of bricks, here brick-coloured).—General colour a rich orange rufous (between Orange Rufous and Sanford's Brown, II.), very variable in shape and often much deformed, sometimes imbricated with thin (about 3 mm.) irregularly fluted horizontal brackets and encrusting base, sometimes from an encrusting mass on the ground at the base of a stump with a fan-shaped stipitate pileus contracted laterally into a stem-like base about ½in. (1.2 cm.) long and about 3 mm. thick, more often laterally attached forming a deformed bracket up to 5in. (12.5 cm.) laterally, 1½in. (3.7 cm.) from before backwards, rather thin but up to ½in. (1.2 cm.) thick in the centre, the margin thin. Upper surface irregularly convex, when substipitate depressed near the stem, rather rough, tending to be crustulose and to crack or radiately fibrillose-rugulose and finely rough, Cinnamon Buff to Cinnamon (XXIX.) or pallid. Hymenial surface irregularly concave, pallid or Tawny Olive (XXIX.), pore orifices irregular, usually about 3 in 1 mm., rarely nearly 1 mm. in diameter, dissepiments thin, tubes up to 5 mm. deep, near Cinnamon Buff (XXIX.). Context radiately fibrillose, thin, usually about 5 mm. thick, light when dry, firm but rather brittle, Orange Rufous to Sanford's Brown (II.). Spores spherical to oval but a little irregular, white, 5 μ, 5 x 4 μ. The radiately fibrillose context shows the tendency to a stipitate form, the radiations in sessile plants laterally attached throughout their length being very oblique and approaching parallelism with the surface. At the bases of old stumps and once on a living trunk of *Eucalyptus viminalis* Labill. South Australia—National Park, Eagle-on-the-Hill (Mount Lofty Range), Kuitpo. May, June.

The species can be readily determined by the situation, namely at the base of stumps, by the radiating firm-brittle orange-rufous context, and the often deformed appearance of the brackets.

324. **Polyporus pelles** Lloyd. (Syn., *P. atrohispidus* Lloyd.) (L., *pellis*, the skin of a beast, a pelt).—Pileus Russet (XV.) to Mars Brown (XV.), near Bay (II.) with paler areas, or near Rood's Brown (XXVIII.), villous to hispid with brownish fibrils often in fascicles and sometimes scattered and showing a whitish fibrous surface beneath, nearly plane to slightly convex, up to 4½in. (10.6 cm.) laterally by 3in. (7.5 cm.) from before backwards, edge rounded, contracted sometimes into a narrow short stem-like base but usually broadly and somewhat decurrently attached by one-third or more of its border. Hymenial surface convex or concavo-convex, pores minute (about 0.2 to 1 mm. in diameter), close, irregular, dissepiments thin, whitish, pallid or with a pale ochraceous tinge (Light Pinkish Cinnamon, XXIX.), when bruised or older turning Russet (XV.), the tubes when cut Pale Ochraceous Salmon (XV.), becoming Russet (XV.), occasionally ½in. (1.2 cm.) deep. Context radiately strigose, Pale Ochraceous Salmon becoming Russet, up to 1in. (2.5 cm.) thick at its attachment, gradually attenuating outwards. Flesh easily cut like firm cheese, softish but coherent, concentrically zoned, turning dark brown (Warm Sepia, XXIX.). Spores abundant, elliptical, one side a little flattened, white to pallid, some coloured brownish, 4.5 to 7.5 by 3.2 to 4 μ. On living and dead *Eucalyptus* trunks and stumps. South Australia—On trunks of living *E. obliqua* L'Herit and on dead stumps, Mount Lofty; National Park; Kuitpo; Back Valley off Inman Valley. New South Wales. Victoria. May to July.

This is a common species on living trunks and dead stumps of Stringy-bark (*E. obliqua*). It is somewhat fleshy when fresh, the upper surface brown and hairy, and the tubes pallid, readily becoming brownish (*e.g.*, russet) when bruised.

325. **Polyporus Victoriensis** Lloyd. (Adjectival applying to the Australian State, Victoria).—"Pileus sessile, large, 5 x 8in. (12.5 to 20 cm.) and 3in. (7.5 cm.) thick, ligneous suggesting a *Fomes*. Surface with thin, pale, glabrous crust, much wrinkled, context brown. Pores about 1.5 cm. long, coarse to the eye, brown, the mouths darker, dissepiments thin, orifices about 3 in 1 mm. Setae none. Hymenial elements hyaline. Spores hyaline, globose, smooth, 4 μ (3.2 to 3.8 μ, J.B.C.)."—Lloyd. South Australia—On dead Eucalypt, National Park. September.

326. **Polyporus dryadeus** (Pers.) Fr. (Gr., *drys*, the oak).—More or less hoof-shaped to bracket-shaped, triangular on section, 3½in. (8.7 cm.) laterally, 3¼in. (8.1 cm.) from before backwards, 2½in. (6.2 cm.) vertically at its attachment. Upper surface irregularly plane to convex, gibbous near its attachment, more or less zoned and rugose, with a crust, paler than Tawny Olive (XXIX.) to near Ochraceous Tawny (XV.). Hymenial surface descending, convex, concave near the edge which is rolled in a little, brown with pallid glaucescent pore orifices which are minute, 2 to 3 in 1 mm., a little irregular, dissepiments rounded, tubes up to ¾in. (1.8 cm.) deep, near Dresden Brown (XV.), a little greyer than the context. Context radiating, near Raw Sienna (III.), near Buckthorn Brown (XV.) to between Tawny and Russet (XV.), Yellow Ochre (XV.) or pallid turning slightly yellowish-brown and cutting easily when young, with a tendency to a paler mycelial core. Spores elliptical, one side a little flattened, hyaline or barely tinted, 8.5 to 8.8 x 5 to 7 μ. No setae seen in the Australian specimens. On living trunks of *Eucalyptus obliqua* L'Herit. (Stringy-bark) up to 10ft. from the ground. South Australia—Mount Lofty. Europe. May to July.

The identification of this species was made by Dr. C. G. Lloyd. Possibly the Australian plant is not the same as the European *P. dryadeus* which usually grows on oaks and shows occasional setae. It is rare in South Australia and is characterised with us by being hoof-shaped to triangular, with a thin brown crust, convex brown glaucescent hymenial surface and a thick context which often shows a central mycelial core.

327. **Polyporus gilvus** (Schw.) Fr. (L., *gilvus*, pale yellow as applied here, the dictionary definition being carnation or flesh-colour and applying to *Trametes lilacino-gilva*). More or less applanate, dimidiate or shelf-like, sometimes somewhat imbricate, sometimes a vertical irregular patch several inches in extent with brackets above and on its surface, sometimes extending upwards at its attachment, sessile throughout its extent or sometimes the attached edge somewhat diminished, a well-developed bracket 3½in. (8.7 cm.) laterally, 1½in. (3.7 cm.) or more from before backwards, and usually about ½in. (1.2 cm.) vertically in the middle, ¾in. (1.8 cm.) at the attachment. Upper surface convex,

granularily rough to strigose or velvety towards the free edge, occasionally somewhat zoned, Sayal Brown, Snuff Brown, Tawny Olive (XXIX.) or near Cinnamon Brown (XV.), edge moderately acute, sometimes bayed. Hymenial surface horizontal, slightly concave, Sayal Brown to Snuff Brown (XXIX.) or Bister (XXIX.), pore orifices minute, 4 to 6 in 1 mm., tubes up to $\frac{1}{4}$in. (6 mm.) deep, paler than Snuff Brown. Context radiating, tough, cut with difficulty with a knife, $\frac{1}{8}$ to $\frac{3}{8}$in. (3.5 to 10 mm.) thick, gilvous between Yellow Ochre and Buckthorn Brown (XV.) or near the latter. Spores elliptical, hyaline, smooth, 4 x 3 μ. Setae usually abundant, sometimes not found, acute, dark brown, 33 x 5.5 μ at the base. Hyphae irregular, yellow brown, 2 to 4.5 μ. South Australia—Mount Lofty, National Park, Mylor, Kuitpo, Kangaroo Island (setae not seen), South-East. March to June, October. Queensland. New South Wales. Victoria. Western Australia. Europe, etc.

A thicker form, more hoof-shaped, with a dark brown crust on the older portion and a rounded pallid greyish-brown edge, with the tube orifices more irregular and a little larger (to 3 in 1 mm.) occurs with us (Mount Lofty, National Park, Kuitpo—May, June, October).

Dr. C. G. Lloyd distinguishes *P. scruposus* Fr. from *P. gilvus* by its being excessively rough with little tubercles and granules, but doubts whether it can be maintained even as a form. Some of our specimens could be considered as *P. scruposus*.

P. lichnoides Montagne is, according to Lloyd, a very thin form of *P. gilvus*, almost like *Polystictus*. We have specimens he has identified from Narrabri and Milson Island in New South Wales but have not met with it in South Australia.

Polyporus gilvus is a common species and, with its related forms, can readily be recognised by the usually bracket shape, the rough granular to strigose brown upper surface, the tough gilvous (yellow ochre to buckthorn brown) context, the rather small brown orifices and microscopically by the colourless spores and brown setae.

328. **Polyporus subcontigua** Clel. et Rodw. (*Sub*, here from the resemblance to *Poria contigua* Pers.).—Sometimes forming small ungulate Fomes-like brackets, occasionally when the attachment is narrowed almost stalked, 5 mm. in size, with a greyish-brown rather radiately rough convex upper surface and a convex or concave pallid under-surface on which the irregular pores appear (these colours may be due to weathering). These small brackets may be alone present or the plant may be almost entirely resupinate, with here and there small brackets or narrow shelves with the above features. The resupinate portion may extend over several centimetres (*e.g.*, 6 x 2 cm.), is very thin (1 to 3 mm.), and is near Brussels Brown (III.) to Prout's Brown (XV.) or Tawny Olive (XXIX.) and darker, sometimes with a more gilvous subtomentose edge near Buckthorn Brown (XV.). The pores are irregular, 3 to 4 in 1 mm., often oblique, the dissepiments thin and rather lacerated in the resupinate part, thicker and more rounded in the pileate, the mouths glancing, appearing pallid in certain lights, brown in others. The substance is tough, dark brown in the pileate portion, with no very evident subiculum, the pores being probably stratose and Fomes-like. Spores (?) hyaline, 5 to 7 x 3.5 μ; hyphae yellow-brown, thick-walled, 2 to 4 μ; setae dark brown, subulate to acuminate with a broad base, 26 to 55 x 4 to 9 μ at the base. South Australia—On fallen trunk, Onkaparinga River, near Clarendon; Myponga; Williamstown; on fence post, Clare; Flinders Range, near Quorn. Western Australia? June, August.

The species can be recognised by the size of the pore-mouths (3 to 4 in 1 mm.), the presence of brown setae, and the tendency to form narrow shelves or small ungulate brackets. The small size of the latter, when occurring without a resupinate extension, renders them difficult to detect, the upper surface resembling the dead wood of the substratum, but the pallid pore-bearing surface, seen in the brackets but not noticeable in the resupinate extension and probably partly due to fading, forms a contrast when the log is turned, which draws attention to the fungus.

329. **Polyporus Ludovicianus** Patouillard (*Ludovicianus*, adjectival of a proper name).—Dr. C. G. Lloyd considers this as a thin form of *P. cuticularis* Bull. which is placed under his Fourth General Division with spores and context coloured, and in Section 100 with brown context and setae. In this section *P. cuticularis* is placed in subsection A with the surface tomentose or hispid,

and in subsection B with surface smooth or at length smooth is placed *P. Patouillardii* Rick. Dr. Lloyd has identified specimens of both *P. cuticularis* and *P. Patouillardii* from New South Wales and as both may also occur in this State short descriptions are here given. In these Australian specimens, the points of distinction between the two species are not very evident and possibly we are dealing with only one species.

The specimens of *P. Ludovicianus* are large (4 to 7½in. laterally x 3 to 5in. x ½ to 1in. thick, 10 to 17.5 x 7.5 to 12.5 x 1.2 to 2.5 cm.), sessile, more or less applanate. Upper surface tomentose when young becoming smooth and sometimes when old with a dark crust tending to crack, obscurely zoned, somewhat radiately striate, dark brown (near Warm Sepia, XXIX.). Tubes 0.5 to 1 cm. deep, near Snuff Brown (XXIX.), orifices minute, about 4 in 1 mm., darker. Context 0.5 to 1 cm., tough corky, Sayal Brown to Snuff Brown and Warm Sepia (XXIX.), sometimes radiating and redder brown. Spores subspherical, brown, 5 x 3.5 μ, 4 μ. Setae not seen (said by Lloyd to be scanty and sometimes absent). Queensland—Imbil State Forest. New South Wales—Malanganee, Wauchope. United States. February, August.

330. **Polyporus Patouillardii** Rick. (After Professor N. Patouillard, the eminent French mycologist).—These specimens are very like the preceding but thicker, sessile, more or less applanate, sometimes imbricate, up to 3 to 4in. laterally x 3in. x 2in. thick (7.5 to 10 x 7.5 x 5 cm.), light in weight, the surface smooth, dark brown with a crust which cracks. Tubes up to 1 cm. long, with the context near Brussels Brown (III.); orifices 2 to 3 in 1 mm., dark brown. Context with a satiny sheen. Growing mycelium and young tubes near Pale Orange Yellow (III.). Spores abundant, subspherical to triangular, yellow brown, 7 x 5 μ. Some long acuminate setae, 90 x 7 μ. New South Wales—Near Lismore; on *Acacia salicina* Lindl. var. *varians* Benth., Warren. American Tropics. Philippines. Japan. May, August.

P. Ludovicianus and *P. Patouillardii* can be recognised by the more or less applanate shape, the dark brown colour and the coloured spores.

2. Leathery, thin. Tubes homogeneous with the substance of the pileus, not forming a distinct layer.

POLYSTICTUS Fr.

(Gr., *polystiktos*, with many punctures.)

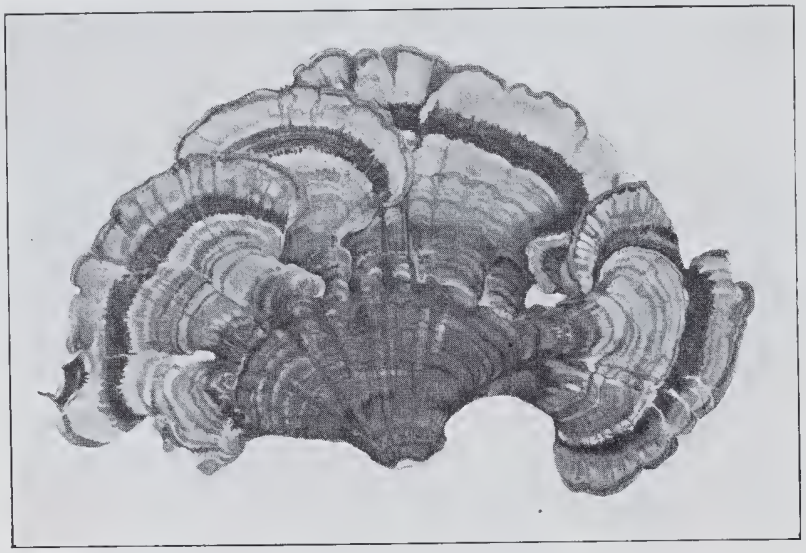
"Pileus coriaceous, membranaceous or somewhat spongy, dimidiate, sessile, surface often zoned. Tubes homogeneous, developing from the centre outwards. Spores white; elliptical, pruniform, oblong, or oblong-elliptical; smooth or punctate. Cystidia sparse or none. Annual. Growing on wood, often imbricate."—Rea.

331. **Polystictus oblectans** Berk. (L., *oblecto*, to attract, to please).—Pileus stipitate, thin, up to 1½ or 2in. (3.7 to 5 cm.) broad but usually less, planodepressed, zoned, radiately fibrillose, tawny cinnamon near Sayal Brown (XXIX.) to near Cinnamon Brown (XIV.) or Mikado Brown (XXIX.) and darker, often with a beautiful silky sheen. Context very thin, 0.5 to nearly 1 mm., near Sudan Brown (III.). Hymenial surface Sayal Brown to Snuff Brown (XXIX.), the sterile edge near Cinnamon Buff (XXIX.), pore orifices minute (about 2 to 4 in 1 mm.), rather polygonal, dissepiments thin with torn edges, sometimes plate-like, tubes up to 2 mm. deep. Stem central, ½in. (1.2 cm.) high, rather slender, villous, solid, tawny cinnamon, sometimes with the buried base enlarged into a cinnamon-coloured, pea-sized or branching tuber-like false sclerotium of sand and mycelium. Spores abundant, elliptical, very slightly tinted, 6.5 to occasionally 8 x 4 μ. On the ground usually in sandy soil. South Australia—Mount Lofty, Mount Compass, Encounter Bay, Mount Burr (S.E.), Bangham (S.E.). New South Wales. May, October.

This is a common small delicate cinnamon-brown species with a silky sheen on the pileus and a central stem and is found growing in sandy soil.

332. **Polystictus versicolor** (L.) Fr. (L., *versicolor*, of various colours).—Variable in colour and in thickness. Usually forming a series of thin, imbricate, rather fan-shaped, convex brackets, velvety and pubescent on the upper surface

and marked with beautiful concentric shining satiny zones of various colours (brown, drab, grey, pinkish buff, whitish, etc.). The mass of brackets may be several inches high and wide, the individual members usually only about 1½in. (3.7 cm.) laterally and 1in. (2.5 cm.) from before backwards. Pileus gradually somewhat constricted towards the base, arching slightly downwards, often depressed behind, somewhat wrinkled and rugose, often radiately strigose, the edge thin, slightly lobed and when growing whitish. Hymenial surface concave to concavo-convex, pale buff, greyish buff, Pinkish Buff (XXIX.), or sometimes near Cinnamon Buff (XXIX.); orifices minute, about 5 in 1 mm., round, becoming torn and irregular, tubes about 1 mm. deep. Context usually thin (about 1 mm.), corky, white. Spores sausage-shaped, slightly curved, 5.3 to 7 x 2 μ. On tops of logs, the pilei may assume a rosette form. On telegraph posts, the plants may appear in a thick irregular form (½in., 1.2 cm., thick) without the formation of



[*From watercolour by H. Butler.*

Figure 48.—*Polystictus versicolor* **(L.) Fr. (No. 332). Blue Mountains, New South Wales. Slightly reduced.**

brackets. Sometimes almost a Fomes-like form is met with. On logs, fallen timber and occasionally telegraph posts, causing a slow rot. Rarely on dead wood of living fruit trees (peach). South Australia—Botanic Gardens, Fullarton (on living peach), National Park (on dead *Hakea*), Waterfall Gully (on the trunk and at the base of basket willows), Greenhill Road, Mount Lofty, Morialta. Mount McIntyre (S.E.). New South Wales. Queensland. Victoria. Tasmania. Probably nearly world-wide. June to October. (Figure 48.)

This is a very common species of thin bracket fungus readily recognised by the beautiful velvety zones of greys and browns on the pileus. *P. hirsutus* Fr., more robust and densely strigose, has not yet been recorded for the State.

333. **Polystictus versatilis** Berk. (L., *versatilis*, versatile, here apparently meaning variable) (Syn., *Polystictus venustus* Berk.).—Forming usually thin extended brackets, to 2in. (5 cm.) or more laterally, projecting up to ¾in. (2 cm.), occasionally hoof-shaped (nearly ¾in., 2 cm.), very light in weight. Pilei densely strigose, becoming denuded leaving a rough surface (*P. venustus, teste* Lloyd), pallid to pallid buff and Cinnamon Buff (XXIX.) near the edge, becoming greyish to dark brown in the older portions. Tubes irregular, usually irpiciform, tending to be elongated, 4 to 14 mm. deep; dissepiments thin, rather fluted, sometimes lacerated; surface becoming near Bister (XXIX.), when fresh sometimes with a violet or purplish tint, cut surface of tubes and context pallid to

between Drab (XLVI.) and Wood Brown (XL.), context very thin. On fallen *Eucalyptus* branches. South Australia—Rocky R. (Kangaroo Island). New South Wales. Victoria.

334. **Polystictus albo-vestidus** Fr. (L., *albus*, white; *vestidus* for *vestitus*, clothed).—Dr. C. G. Lloyd in identifying specimens from Overland Corner, South Australia, January, as *Polysticius albo-vestidus* Fr. (*vide* Mycological Notes, No. 69, Vol. 7, July, 1923, p. 1192, fig. 2401), describes them as follows:—"Pileoli small, imbricate, the surface with a thin covering (like whitewash), which however does not extend to the margin. Pores brown with a purplish cast, large, sinuate. Hymenium covered with subhyaline, projecting hyphae-like bodies, cystidia no doubt, but not strongly specialized. Spores not found. The peculiar white pileus covering is characteristic it appears to me. The pores remind me of *Polystictus versatilis.*" These specimens form an imbricate mass on dead wood, 3in. (7.5 cm.) or more laterally, in parts resupinate for an inch (2.5 cm.) or more, the pileoli projecting 1 cm. The white investiture of the rough older portion of the pileus suggests weathering from exposure to sunlight; the growing edge is rounded, velvety and dark brown (Prout's Brown, XV.). Pores irregular, lacerated, mostly irpiciform; dissepiments thin, sometimes defective; orifices 0.5 to 1 mm., brown with a purplish cast.

b. Tubes at the proximal ends sunk different depths into the context.

(1) Tubes rounded.

TRAMETES Fr.

(L., *trama*, the woof.)

"Pileus woody or corky; dimidiate, or resupinate; sessile. Tubes homogeneous with the substance of the pileus and not forming a distinct layer, regular, round or oblong. Flesh white or coloured. Spores white, rarely yellowish; elliptical, ovoid, globose, subglobose, cylindrical, or oblong; smooth. Cystidia present or absent, hyaline or coloured. Annual or perennial. Growing on wood, very rarely on the ground; sometimes imbricate."—Rea.

A feature of generic importance, not included by Rea in the above description, is that the deep ends of the tubes are sunk to varying depths in the context. This serves to distinguish specimens from those of the genus *Polyporus* which they resemble. Our species form corky firm brackets and are not resupinate.

General colour scarlet .. .. 335. *Trametes cinnabarina.*

General colour brownish lilac, pore surface hydrangeia pink .. .. 336. *T. lilacino-gilva.*

General colour whitish becoming buff when kept. Large, thick, applanate .. .. 337. *T. lactinea.*

General colour woody buff. Hoof-shaped, about 2in. Often on posts. Spores large, truncate .. .. 338. *T. ochroleuca.*

Pileus rough, pinkish buff to tawny olive. Tubes drab, 2 to 3 in 1 mm. Context sayal brown to olive brown .. .. 339. *T. protea.*

General colour tawny olive to cinnamon buff, usually somewhat applanate, decurrent behind. Orifices 0.5 to 1 mm. .. .. 340. *T. devexa.*

Small hoof-shaped brackets, about 6 mm. Pileus convex, blackish, edge whitish. Orifices 0.5 to 1 mm., pallid .. .. 341. *T. epitephra.*

335. **Trametes cinnabarina** (Jacq.) Fr. (Syn., *Polystictus cinnabarinus* (Jacq.).) (Gr., *kinnabari*, dragon's blood).—A common species on dead wood, scarlet in general colour, forming thin shelves 4 to 6in. (10 to 15 cm.) or more laterally, 1½ to 2½in. (3.7 to 6.2 cm.) from before backwards, usually under ½in. (1.2 cm.) thick in the middle and up to ¾in. (1.8 cm.) at the attachment, thinning gradually to the blunt edge which is rounded above. Upper surface slightly convex, pilose to slightly rough, becoming smooth, laterally attached throughout, near Apricot Orange (XIV.). Hymenial surface more or less plane, near Mars Orange (II.) and deeper, pore orifices minute, about 5 in 1 mm.,

regular, tubes in thick specimens often in a definite layer, 1.5 to 2 mm. deep. Context 4 to 8 mm. thick, strigose-corky, Apricot Buff (XIV.). Spores slightly curved, white, 5 x 2.2 μ. South Australia—Adelaide, Mount Lofty, Kuitpo, Currency Creek, Encounter Bay, Wellington, Murray Bridge, Karoonda, Quorn, Beltana, Blinman, Ooldea, Pearson Is. (Great Australian Bight), Mount Wedge (E.P.), Mount Gambier district. Queensland. New South Wales. Victoria. Tasmania. Western Australia. Europe, etc. May, June, August.

This is a very common species on dead wood, such as fallen logs and branches, and probably occurs throughout the State. Its brilliant and beautiful scarlet colouration makes it a conspicuous object, especially when turned over so as to expose the under surface. The upper surface tends to fade from exposure to the light and in very old specimens may be bleached a dirty white. In such cases, breaking the fungus in two will usually reveal a trace of colour still present in the context. It is purely a saprophyte, helping in the decay of dead wood. It has occasionally been found on fruit trees (*e.g.,* peaches, cherry) on dead wood or branches, but even in these circumstances is probably not parasitic. It has also been found on fallen logs of *Callitris*, on dead wood of Native Peach (*Eucarya acuminata* R.Br.), on dead branches of willow and of walnut, on Bunya pine wood (*Araucaria Bidwillii* Hook.), on peppermint gum wood (*Eucalyptus odorata* Behr. et Schl.), and on a scar on the trunk of *Eucalyptus diversifolia* Bonpl. Very rarely small specimens may assume a *Poria* habit.

Polystictus sanguineus L. is similar in colour but very thin and coriaceous and is contracted into a short lateral stem which is orbicularly dilated at the base. It is not uncommon in New South Wales and though recorded by Cooke (No. 746) for South Australia, we have not yet found it in this State.

336. **Trametes lilacino-gilva** Berk. (*Polystictus lilacino-gilvus* Berk.) (L., *lilacinus*, lilac-coloured; *gilvus*, carnation or flesh colour).—Forming sessile bracket-like shelves laterally attached throughout their length, 3in. (7.5 cm.) or more laterally and 1in. (2.5 cm.) or more from before backwards, 0.5 to 1.5 cm. thick. Upper surface slightly and irregularly convex, surface very rough with irregular wrinkles and folds, often radiately fibrillose, not definitely zoned, brownish vinaceous (Liver Brown, XIV., and darker, Walnut Brown, XXVIII.), edge rounded and paler near Hydrangeia Pink (XXVII.). Hymenial surface slightly concave, near Hydrangeia Pink, edge sterile, pore orifices minute, 3 to 4 in 1 mm., a little irregular, dissepiments rounded, tubes 2 to 3 mm. deep, varying a little in depth, when stratose up to 7 mm., deeper at the base, attenuating outwards. Context tough, dark vinaceous near Carob Brown (XXVIII.). Spores elongated, oblique, hyaline, 7 to 8.5 x 2.5 to 3.5 μ. On fallen logs, etc. South Australia—Mount Lofty, National Park, Kuitpo, Halidon, Ravine de Casoars (Kangaroo Island). Queensland. New South Wales. Victoria. Tasmania. Western Australia. May, July.

This is a common and beautiful species found growing on fallen logs and stumps, of a lilac-flesh colour, which may be recognised if the outside has faded on cutting through the substance. At Halidon near Alawoona, east of the Murray, this species has been found causing a rot of karri sleepers imported from Western Australia. Probably the infection was already present when the sleepers were laid down some years ago.

337. **Trametes lactinea** Berk. (L., *lactineus* for *lacteus*, milk white).—Pileus to 6in. (15 cm.) or more laterally x 2 to 4in. (5 to 10 cm.), 1½ to 1¾in. (3.7 to 4.3 cm.) thick, applanate to dimidiate, surface dull, soft, subtomentose, sometimes slightly tuberculate, whitish becoming Pinkish Buff to Cinnamon Buff (XXIX.) when old. Context firm and tough, Pinkish Buff. Under surface nearly plane to convex, concolorous, becoming darker when old; tubes to ¾in. (1.8 cm.) deep; orifices 0.5 mm., rounded; dissepiments rather thin. New South Wales.

This large species, whitish when fresh but becoming buff tinted when old or kept, has not been recorded yet for South Australia but is not uncommon in New South Wales. The substance, cut with a sharp knife, has been used instead of pith for mounting insects.

338. **Trametes ochroleuca** Berk. (*Polyporus ochroleucus* Berk.) (L., *ochra*, ochre; Gr., *leukos*, white).—More or less hoof-shaped to bracket-shaped, attached frequently to fence posts and rails, less often on fallen logs and dead trunks, laterally attached throughout its length. Up to 2in. (5 cm.) laterally, 1¼in. (3.1 cm.) from before backwards and 1¼in. (3.1 cm.) vertically at the attachment where the pileus usually extends upwards, ¾in. (19 mm.) vertically in the

centre, size often less, not frequently more, convex, rugosely zoned, smooth to subvillous, with a more or less definite hard crust, rarely varnished, edge rounded and thick, dark brown to yellowish brown and pallid brownish. Hymenial surface more or less horizontal, irregular, usually slightly convex in parts, orifices small, 3 to 4 in 1 mm., rounded, dissepiments smooth, tubes deep, up to $\frac{3}{4}$in. (19 mm.), sometimes in layers (*Fomes* form), woody buff. Context firm-corky, up to $\frac{3}{8}$in. (9 mm.) at the attachment, woody buff. Spores truncate at one end, white or very slightly tinted, 12 to 19 x 6.5 to 9 μ. South Australia—National Park; Mount Lofty Ranges, Clarendon, Meadows, MacLaren Vale, Willunga Hill, Myponga, Encounter Bay district, Waitpinga (on dead *Casuarina stricta* Ait.), Kangaroo Island, Mount Gambier, Kalangadoo, Big Swamp near Port Lincoln, Mount Dutton (E.P.). Queensland. New South Wales. Victoria. Tasmania. Western Australia. January to March, May to August, October, December.

This is a very common little brown to yellowish brown bracket fungus up to 2in. in size found especially on posts and log fences but also on fallen trunks. The tubes are long and the species can be readily determined by finding the abundant unusually large truncate spores.

339. **Trametes protea** Berk. (*Proteus*, assuming many shapes, after Proteus, a god of the sea, who could transform himself into any shape).—Forming nearly horizontal brackets descending behind, sometimes imbricate, sometimes effused, up to 4½in. (11 cm.) laterally, projecting up to 1in. (2.5 cm.). Pileus velvety in places to very rough (tubercular to firm-shaggy) with a tendency to a radial arrangement, Pinkish Buff (XXIX.) to pallid buffy-brown, Tawny Olive (XXIX.), the velvety portion near Brussels Brown (III.). Tubes 1 to 3 mm. deep; orifices rather hexagonal, 2 to 3 in 1 mm., near Drab (XLVI.) and darker; dissepiments rounded, rather thin. Context corky firm, about 6 mm. thick, Sayal Brown to Snuff Brown (XXIX.) (Olive Brown, XL.—Lloyd). Queensland. New South Wales.

Not yet recorded for South Australia.

340. **Trametes devexa** Berk. (L., *devexus*, shelving, hanging down).—Forming irregular patches up to $1\frac{3}{4}$ x $\frac{3}{4}$in. (4.3 x 1.8 cm.), almost *Poria*-like, with an upper raised subtomentose rim 2 mm. wide and a descending effused pore-surface with orifices about 1 mm. diameter, dissepiments thin or rounded, the tubes 2 to 3 mm. deep, context about the same or less, Cinnamon Buff (XXIX.). South Australia—On the rough bark of Corkwood (*Hakea intermedia* Ewart et Davies) Echo Hill between Moorilyanna and Ernabella (North-West). August.

The above South Australian specimens are abnormal, probably owing to the dry district in which they grow, in forming small scattered almost effused patches. Specimens from Imbil Forest near Gympie, Queensland, August, identified by Dr. C. G. Lloyd, present the normal fruiting form. Forming somewhat applanate to descending elongated sometimes imbricate brackets, decurrent behind, up to 5in. laterally x 1½in. deep x ½in. thick near the base of the bracket (12.5 x 3.7 x 1.2 cm.), the pore surface descending 1in. (2.5 cm.) or more. Pileus velvety to strigose and harsh strigose, surface irregular, more or less concentrically sulcate and zoned, Tawny Olive (XXIX.) with darker bands, edge thin and subacute to rounded. Tubes 1 to 4 mm. deep, sunk to varying depths, orifices 0.5 to 0.75 mm. diameter, Cinnamon Buff (XXIX.) to near Tawny Olive. Context firm-corky, somewhat radiating, concolorous with the tubes.

341. **Trametes epitephra** Berk. (Gr., *epi*, on, upon; *tephra*, ashes sprinkled over the head and clothes in token of grief—here probably from the suggestion of mourning apparel).—Specimens identified by Dr. C. G. Lloyd from Wangan, Pilliga District, New South Wales, October, growing on the pallid fibrous bark of *Eucalyptus Woollsiana* R. T. Baker form a number of small brackets approaching a hoof-shape, about 6 mm. laterally, about 5 mm. vertically, somewhat decurrent behind, the pileus projecting about 2 mm. Pileus convex, slightly irregular, finely subvillose, blackish, edge whitish. Pores irregular, rather large, 0.5 to 1 mm., shallow, dissepiments rounded, sometimes defective, whitish with a pale buff tint.

The species was described from South Australia and specimens collected from the fallen trunk of *Eucalyptus odorata* Behr. et Schlechtd. in the National Park, July, at first thought to be immature specimens of *Hexagona Gunnii* Berk., agree so closely with those identified by Dr. Lloyd that there seems no doubt as to their identity. These are somewhat larger, up to 2 cm. laterally, deseend further (to nearly 2 em.) and project more (to 7 mm.). The upper surface of the

bracket is convex, very irregular and rough, and dark brown to blackish, much the colour of the dark rough bark of the tree. Pores irregular to rounded, 0.5 to 1 mm., dissepiments rounded, Pinkish Buff (XXIX.) or paler. Context a little darker.

(2) Tubes wide, more or less hexagonal.

HEXAGONA Fries.

(L., *hexagonus*, having six angles.)

"Pileus corky or coriaceous, sessile, dimidiate. Pores large, polygonal or rounded, separated by thick partitions continuous and homogeneous with the substance of the pileus. Spores smooth, white (or pale brown)."—Bourdot and Galzin.

The large, usually polygonal, pores with thick partitions characterise the genus. Our two species both have exceptionally large spores. In *H. decipiens* these are pale brown which does not accord with the generic description as given by Bourdot and Galzin.

342. **Hexagona decipiens** Berk. (L., *decipio*, to entrap, to deceive).—Forming brackets, usually single, sometimes imbricate, up to 3in. (7.5 cm.) laterally and 1¼in. (3.1 cm.) from before backwards, laterally attached along the whole length

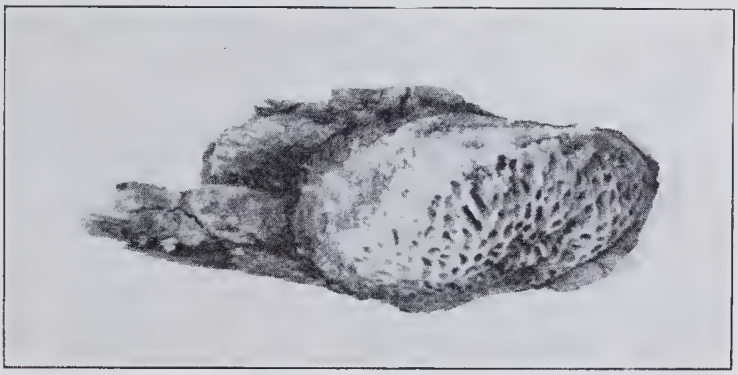
[*Drawing by H. Jastelius.*

Figure 49.—*Hexagona decipiens* **Berk. (No. 342). On sheoak, Clare. Also underside, showing large pores. X2.**

or for only the central half, the attachment extending a little upwards and downwards (up to ¾in., 1.8 cm.). Upper surface convex, concentrically sulcate and zoned, harsh fibrillose to villous, edge convex, dark brown near Clove Brown (XL.), edge like the under surface near Buffy Brown (XL.). Hymenial surface plane to slightly concave, pore orifices round-polygonal, up to 1 mm. wide, 5 to 6 in 5 mm., dissepiments rather thin but rounded, brown with a grevish bloom, tubes up to 6 mm. deep. Context brown, about 1.5 mm. thick. Thickness of pileus about 5 mm. in the centre, equally attenuated outwards from the attachment. Spores obliquely elliptical to rather mummy-shaped, pale brown, 15.5 to (rarely) 22.5 x 6.5 to 10.5 μ. On dead, sometimes on living, Sheoaks (*Casuarina stricta* Ait) and other species of *Casuarina*. Once on dead *Eucalyptus leucoxylon* F.v.M., and on Sheoaks adjacent (Clare). South Australia—Clare, Mount Remarkable, Quorn, Bangham (S.E.), Marble Range (E.P.), Pearson Islands (Great Australian Bight). Victoria. New South Wales. Queensland. January, May, June, August. (Figure 49.)

Abnormal forms, together with normal ones, were found on the underside of dead *Casuarina stricta* wood on Pearson Islands. These were disc-shaped, the orifices unduly large (2 mm. or more), the dissepiments thin.

343. **Hexagona Gunnii** Berk. (After Ronald Campbell Gunn, F.R.S., 1808-1881, the Tasmanian botanist, at one time private secretary to Sir John Franklin).—Thick, more or less hoof-shaped, ¾ to 2¼in. (1.8 to 5.6 cm.) laterally, rarely up to 1in. (2.5 cm.) from before backwards. Upper surface irregularly convex, sometimes extending upwards at the attachment, tomentose becoming smooth, occasionally polished, rarely rough, sometimes with raised and reticulated lines, pallid with an ochraceous tint, rarely with dark brown tints or dark tan-coloured, when old sometimes dark brown, free edge rather rounded. Hymenial surface convex or concavo-convex, often descending, rarely bracket-like; pore orifices pentagonal, sometimes elongated, irregular, varying in size, 1 to 2.5 mm. wide, dissepiments usually thick and rounded, sometimes rather thin, sometimes imperfect; tubes concolorous with the upper surface, extending to irregular depths up to 10 mm. into the pale umber-brown corky-woody context. Spores elongated,



[*Photo. by S. Tee and W.P.C.*

Figure 50.—*Hexagona Gunnii* **Berk. (No. 343). Mount Wedge (E.P.). Note large pores.**

with a large round or oval gutta, hyaline, 15 to 24 x 6.5 to 8 μ. Up to 10ft. or more from the ground on trunks of dead or sick Eucalypts (*E. odorata* Behr; et Schl., *E. viminalis* Labill.). South Australia—Glen Osmond hills, National Park, Encounter Bay district, Kinchina, Quorn, Mount Wedge near Elliston (E.P.). Victoria. New South Wales. Tasmania. Western Australia. January, April to September. (Figure 50.)

The species forms rather small hoof-shaped brackets with large pentagonal orifices on the trunks of dead or dying Eucalypts. The very large, elongated, colourless spores hall-mark the species.

2. Tubes torn into teeth.

IRPEX Fr.

(L., *irpex*, a harrow.)

"Pileus corky, coriaceous or membranaceous; dimidiate or resupinate; sessile. Tubes homogeneous, alveolar at first, then becoming torn into teeth or plates. Flesh white or coloured. Spores white; elliptical, oval, globose, cylindrical or elliptic-oblong; smooth or punctate. Cystidia present or absent. Growing on wood, rarely on the ground."—Rea.

Irpex differs from *Polystictus* in the tubes becoming torn into teeth or plates, instead of remaining regular. Some authorities place the genus under Hydnaceae, considering the lacerated teeth or plates as representing confluent spines. The only common species with us is the resupinate *Poria*-like, buff-coloured *I. obliquus*, found growing on fallen logs and sticks, the trunks of Eucalypts and similar situations.

KEY TO THE SPECIES.

Entirely resupinate, buff-coloured, Poria-like . . . . . 344 and 345. *Irpex obliquus.*

Usually forming thin brackets, about 2in. laterally. Pilei strigose, pallid to cinnamon buff, becoming grey to dark brown. Orifices bister with a violet tint. Context pallid to drab . . . . . 333. Irpex-like forms of *Polystictus versatilis.*

Forming small patches of decurrent pinkish buff to cinnamon buff tubes with occasional traces of a dark greyish brown upper surface . . . . . 346. *Irpex epitephrus.*

344. **Irpex obliquus** (Schrad.) Fr. (L., *obliquus*, oblique).—Colour deeper than Pinkish Buff (XXIX.), approaching Cinnamon Buff (XXIX.), or Light Ochraceous Buff (XV.) passing into Cinnamon Buff, when young whitish, creamy white, or pallid, deepening in colour on drying, irregularly effused with an indefinite felted sterile edge of the same colour or slightly paler, rarely whitish, not readily separable from the substratum, punky-friable, often many inches in extent and sometimes with outlying scattered masses. Thickness up to 1 mm. Pore mouths about 0.2 to 0.4 mm., occasionally 0.5 to 0.7 mm. and once 1.25 mm. wide when growing horizontally, just readily seen by the naked eye, larger and coarser and more irpiciform when growing vertically or the dissepiments then appearing as linear irregular plates, the dissepiments fluted when oblique. When horizontal, the pore mouths vary in size, often with a few considerably larger than the others. About 4 pore mouths, sometimes 2 or 3, in a length of 1 mm. when growing horizontally. Edges of the pore-mouths irregular, jagged, often plate-like, more or less finely setulose, septa sometimes imperfect. Depth of pores about 0.5 to 0.75 mm. Spores slightly yellowish, oval or pear-shaped flattened on one side, with an oblique apiculus and a central globule, 5 to 7 x 2.5 to 4 μ, usually about 5.6 to 6 x 3.5 μ. Hyphae faintly tinted, rather irregular, sometimes ribbon-like, thick-walled, occasionally septate, 2.5 to 4 μ, occasionally 4.5 μ. South Australia—Adelaide and suburbs, Mount Lofty Ranges, National Park, Knitpo, Mount Compass, Ashbourne, Encounter Bay district, Mount Gambier, Quorn. New South Wales. Victoria. Tasmania. Western Australia. New Zealand. Europe, etc. Throughout the year.

This is a common and variable Australian species found growing on the rough bark of many of our Eucalypts and on fallen branches, bark, and wood. When growing vertically, the irpicoid arrangement is clearly shown, and as the majority of specimens are in a more or less vertical position, the irpex form of the plant is a common one. Sometimes on the underside of a log is grows horizontally, and then it would be classed as a *Poria*, though even thus the pore mouths are rather plate-like and jagged. Amongst our specimens, chiefly collected in New South Wales and South Australia, we find that in addition to the irpicoid and poria forms, what appears to be the same species may sometimes grow on a rough uneven surface as little projecting knobs, and the pore months on these knobs may show a labyrinthiform or fluted arrangement with the dissepiments defective in places. This is evidently merely a growth form and not a variety, as normal growth and the labyrinthiform knobby one, or a labyrinthiform arrangement without knobs, may occur on the same piece of wood. The colour also varies somewhat in depth. Considering the variability, it may be well to state in broad terms as a guide to other collectors what types of plants we would place under *Irpex obliquus*. Resupinate irpiciform, or poria-like fungi, indeterminate and often extensive, in colour near Pinkish Buff, Cinnamon Buff, or Light Ochraceous Buff, with a felted sterile edge sometimes extensive of the same colour or slightly paler but not pure white, thin (up to 1 mm.), adherent, the tubes somewhat variable in size but mostly 0.2 to 0.4 mm. in diameter, 2 to 4 in 1 mm., irpiciform or definitely poria-like but if the latter with thin dissepiments tending to be lacerated and the mouths more or less setulose, spores 5.2 to 7 x 2.5 to 3.8 μ, usually 5.5 to 6 x 3.5 μ.

345. **Irpex obliquus** var. *argillacco-cinnamoneus* Rodw. et Cleland (L., *argillaceus*, made of white clay, here clay-coloured; *cinnamoneus*, cinnamon-coloured).—A variety with the pores becoming Clay Colour (XXIX.) or deeper and a pale edge, the general appearance rather coarse, pore orifices 0.2 to 0.4 mm. South Australia —Mount Lofty. New South Wales. June, November.

346. **Irpex epitephrus** Clel. (*Epitephrus*, here to show the probable relationship with *Trametes epitephra*).—Forming numerous scattered small patches of irpicoid tubes, from a few mm. to rarely 2 cm. in size, dependent or extending downwards from little ledges and inequalities on the surface of dead stumps or wood, almost entirely resupinate but occasionally showing a trace of pileus formation in the shape of a dark greyish-brown upper surface with difficulty distinguishable from the adjacent wood. Tubes irregular, irpiciform, about 0.5 mm., decurrent, Pinkish Buff to Cinnamon Buff (XXIX.). Spores ? 5.5 x 2.5 μ, hyphae 4 μ diameter. South Australia—National Park. June.

ECHINODONTIUM Ellis et Ev.

(Gr., *echinos*, a hedge-hog; *odous, odontos*, a tooth.)

"Receptacle as in *Hydnum* or *Irpex*. Pileus woody. Spines with small teeth on the sides."—Killermann.

No species recorded for Australia.

SISTOTREMA (Pers.) Fr.

(Gr., *seistos*, shaking; *trema*, a hole.)

"Pileus fleshy, hemispherical, spathulate, effuso-reflexed or resupinate. Stem central, lateral or none. Tubes becoming broken up into teeth or plates, and anastomosing at the base. Flesh pale or coloured. Spore white; subglobose, oboval, or oblong; smooth or echinulate; basidia with 4-8 sterigmata. Cystidia none. Growing on the ground or on wood."—Rea.

No species recorded for South Australia.

3. Tube-like spaces formed of lamellae which anastomose.

DAEDALEA (Pers.) Fr.

(Gr., *daidalos*, curiously wrought.)

"Pileus spongy, corky, coriaceous or woody; dimidiate, or resupinate; stipitate or sessile. Stem central, lateral or none. Tubes homogeneous with the substance of the pileus and not forming a distinct layer, irregularly sinuous and more or less labyrinthiform, often becoming torn or toothed. Flesh white or coloured. Spores white; oval, pip-shaped, subglobose, elliptic-oblong or sausage-shaped; smooth or punctate. Cystidia present or absent. Annual or perennial. Growing on wood, very rarely on the ground; sometimes imbricate."—Rea.

The irregularly sinuous or labyrinthiform tubes are the chief characteristic of the genus. The only species recorded, *Daedalea biennis*, usually appears with us as very deformed masses at the butts of olive trees.

347. **Daedalea biennis** (Bull.) Quel. (Syn., *Polyporus rufescens* Fr.) (L., *biennis*, two years).—Forming large masses, up to 6 x 3in. (15 x 7.5 cm.) or more, usually much deformed, with patches forming pores, encrusting the soil and embedding small sticks and grass stems, at the bases of living trees and stumps. Better-formed sporophores show a somewhat depressed and irregular upper surface with raised subsidiary pilei which are subvillous, pallid approaching Pinkish Buff (XXIX.), in the centre with tints near Vinaceous Fawn (XL.), imperfect sporophores very rough and tubercular, sometimes near Cinnamon Buff (XXIX.). Hymenial surface decurrent on to an irregular contracted often broad stem-like attachment, near Pinkish Buff (XXIX.), pore orifices 1 to 2 in 1 mm., irregular, often elongated radially, dissepiments lacerated, often defective, almost Irpex-like. Context firm and rather hard, browner than the Pinkish Buff of the pores, more earthy brown towards the base. An indefinite thick stem-like attachment buried in soil, etc., at the base of a stump or trunk. Spores subspherical-elliptical, 5 to 5.5 x 3.4 to 4 μ, occasionally 7.5 x 5.5 μ. South Australia—At the bases of several living cultivated olives (*Olea europaea* L.), Beaumont near Adelaide; on rafter of an old bridge and on a buried stump, Mylor. Queensland. Europe. Developing after heavy rain and then surviving till destroyed by insects, so probably to be found during most of the year—so far collected from January to July.

LENZITES Fr.

(After Harold Othmar Lenz, a German Botanist.)

"Pileus corky or coriaceous, dimidiate or resupinate, sessile. Gills coriaceous, often anastomosing at the base, homogeneous with the substance of the pileus and not forming a distinct layer. Flesh white or coloured. Spores white; elliptical, subglobose, cylindrical or oblong-elliptical; smooth. Cystidia sparse or none. Growing on wood, often imbricate."—Rea.

The species form corky or corky-firm brackets or resupinate patches, resembling species of *Polyporus, Irpex*, etc., in general appearance but characterised by an evident gill-like arrangement of the hymenium. The gills are coriaceous, firm, plate-like and often radiating, and are connected by cross branches so as to form elongated cells. In the brush forests of New South Wales and Queensland, *Lenzites repanda* forms large whitish brackets on dead wood, but this species does not occur in South Australia. A section of the genus grows on coniferous wood and it is of interest to find this section represented in Australia by a species, or more than one species, saprophytic on *Callitris* wood.

[*Photo. by S. Tee.*

Figure 51.—*Lenzites striata* Swartz. (No. 348). On wood of Native Pine.

KEY TO THE RECORDED AUSTRALIAN SPECIES OF *LENZITES* GROWING ON CONIFEROUS WOOD.

Yellow tawny, then date brown with yellow tawny edge, corky coriaceous, hard, strigosely tomentose. Gills yellowish becoming umber	*	*Lenzites sepiaria.*
Umber, tomentose becoming smooth, thin, comparatively soft. Gills yellowish red becoming glaucous	*	*L. abietina.*
Ferruginous, pubescent, soft, obsoletely zoned. Gills cinereous	348.	*L. striata.*

* Not yet recorded for South Australia.

A *Lenzites*, or more than one species, is not uncommon on the dead wood of species of the Australian Coniferous genus *Callitris*. Even in the same locality, the specimens may show considerable variation. It seems quite likely that only one species of *Lenzites* has to be considered though the late Dr. C. G. Lloyd has

determined three for us growing on *Callitris* wood, and in the above Key we have tried to bring out the features by which from their descriptions the three species may be differentiated. Of the specimens forwarded to Dr. Lloyd, one, from Manildra, New South Wales, he considered as probably an old example of *L. sepiaria* Fr. It had apparently a pale growing edge and agrees fairly well with American specimens determined as such by Dr. Weir. Other thin plants from the Hawkesbury River, New South Wales, he determined as *L. abietina* Fr. He determined a zoned form from Narrabri, New South Wales, as *L. striata* Swartz, though he thought it differed a little from American (?) plants. He determined as *L. striata* (with comment) extensive thin brown zoned velutinate plants with a tendency to a pale edge from Imbil State Forest, near Gympie, Queensland (perhaps growing on some Coniferous species other than *Callitris*). In two localities in South Australia we have met with a *Lenzites* growing on *Callitris*. From one of these localities, Kinchina, one collection matches the Gympie one, another is practically indistinguishable from specimens of *L. striata* forwarded by Dr. Lloyd, both being almost dimidiate, whilst a third is like Dr. Weir's collection of *L. sepiaria*. We have decided to refer the South Australian specimens to *L. striata* and are inclined to think that our collections from the other States also belong to the same species.

348. **Lenzites striata** Swartz. (L., *striatus*, furrowed).—Forming almost dimidiate imbricate brackets up to ¾in. (18 mm.) broad, or thinner reflexed pilei laterally attached by a broad base, or laterally attached convex to nearly plane brackets, 3in. (7.5 cm.) or more laterally, projecting 1¼in. (3.1 cm.), often imbricate, or when growing round the base of a stump imbricate and like a flattened rosette. Pileus obscurely zoned, rather irregular, velutinate to adpressed strigose, 3 to 5 mm. or more thick, near Snuff Brown (XXIX.) becoming pallid, growing edge sometimes pale. Gills according to the shape of the pileus tending to radiate, if the attachment is stem-like decurrent on to it, usually lacerated, sometimes crinkled, occasionally anastomosing, about 0.5 mm. apart, Snuff Brown becoming Bister (XXIX.) with a cinereous tinge. Spores elongated, 9.5 to 11 x 3.7 to 4.5 μ. South Australia—Kinchina, Polda (E.P., 30 miles N.E. of Elliston). July, August, November. (Figure 51.)

CYCLOMYCES Kunze.

(Gr., *kyklos*, a circle; *mykēs*, a fungus.)

"Receptacle leathery, membranaceous or tough fleshy, resupinate, half-hat-shaped or central stemmed. Hymenophore of mostly vein-like united lamellae arranged concentrically, parallel with the edge, on the underside of the receptacle."—Killermann.

No species recorded for Australia.

FAVOLUS Fries.

(L., *favus*, honeycomb.)

"Receptacle leathery, fleshy or almost membranaceous. Hymenium of anastomosing lamellae reticulated radially in an elongated cellular or honeycomb fashion. Basidia with four sterigmata. Spores hyaline."—Killermann.

Favolus hispidulus B. et C. is recorded for South Australia in Cooke's Handbook of Australian Fungi, No. 900, but we have not met with it.

F. rhipidium Berk. (Cooke, No. 899), following Dr. C. G. Lloyd, is placed under *Polyporus* (see No. 312 in this Handbook).

ELMERINA Bresadola.

(After Elmer, an American collector.)

"Receptacle membranaceous-leathery, hat-shaped. Hymenophore porose-lamellate or daedaloid, densely bristly the bristles many celled."—Killermann.

No species recorded for Australia.

HYMENOGRAMME Berk. et Mont.

(*Hymenium*, the spore-bearing part of the fungus; Gr., *grammē*, a stroke in writing, a line.)

"Receptacle becoming resupinate. Hymenium of thin, very narrow, anastomosing, forked, parallel, line-forming, lamella-like elevations, resembling *Lenzites*."—Killermann.

No species recorded for Australia.

II. Receptacle resupinate, not gelatinous.

PORIA (Pers.) Fr.

(Gr., *poros*, a pore.)

"Pileus membranaceous, coriaceous or corky; entirely resupinate. Tubes round or angular, often directly inserted on the mycelium. Spores white or coloured, elliptical, pruniform, globose, subglobose, obovate, elliptic oblong or cylindrical; smooth or punctate. Cystidia present or absent, hyaline, rarely coloured. Growing on wood, rarely on the ground."—Rea.

In *Poria*, of which we have a number of species, the regular tubes, which are often quite shallow, are seated usually directly on the mycelium and there is no reflexed portion or attempt at pileus formation.

KEY TO THE AUSTRALIAN *PORIAS* AND *PORIA*-LIKE FUNGI.

I. Hyphae dull yellowish. General colour of plants, old gold.

A. Setae present.
Setae 165 to 190 x 8 to 11.5 μ. Pores minute, 6 to 7 in 1 mm. .. .. 349. *Poria setuloso-crocea.*

B. Setae few or absent.
Pores 2 to $2\frac{1}{2}$ in 1 mm. .. .. 350. *Poria crocea.*

II. Hyphae yellowish-brown and hence the substance brown of various shades.

A. Setae present and readily demonstrable.
Setae usually under 50 μ long.
Pores 3 to 4 in 1 mm.
Substance thin, tawny olive, Prout's brown, Brussels brown, tendency to pileation in narrow brackets or in ungulate frustules with pallid pores .. .. 328. *Polyporus subcontigua.*
Substance thin, wood brown to buffy brown, setae acuminate, 45 x 9 μ .. .. 351. *Poria Victoriae.*
Substance thin (in Australian plants), darker, snuff brown to bister, edge velvety, setae with broadened bases, 18 to 45 x 5 to 9 μ .. .. 352. *Poria contigua.*
Pores 4 to 7 in 1 mm.
Ferruginous, then ferruginous brown, tawny, or cinnamon (Australian plant tawny olive), light (not heavy), pores 5 to 6 in 1 mm., setae 27 to 50 x 7 μ .. .. 353. *Poria ferruginosa.*
Darker, umber brown or dark tawny brown, subiculum almost none, thin or thick, pores 5 to 6 in 1 mm., setae ventricose, 15 to 30 x 4 to 5.8 μ .. .. 354. *Poria laevigata.*

Dresden brown to darker, cut surface wood-colour, not very dark, edge definite and more gilvous, pores 5 to 6 in 1 mm. .. .. 355. *Poria sublaevigata.*

Snuff brown, subiculum more tawny, pore layer distinct, pores 5 to 7 in 1 mm., setae 19 to 32 x 7 μ, sometimes not found .. .. 298. *Fomes conchatus* (resupinate form).

Brussels brown, substance more gilvous, subiculum considerable, some setae hooked .. .. 356. *Poria uncinata.*

Setae over 50 μ long.

Argus brown, context more gilvous, thick, relatively light in weight, pores 2½ in 1 mm., setae 64 to 72 x 8 μ .. .. .. 357. *Poria subweirii.*

B. Setae absent or few and hard to find.

Spores hyaline, some occasionally tinted.

Thin or thick (1 to 7 mm.), Sudan brown becoming Brussels brown, pores 4 to 5 in 1 mm., spores hyaline, sometimes tinted, 6 to 7 x 5 to 5.5 μ, setae none or rare .. .. 358. *Poria Friesiana.*

Thin to 6 mm., "ferruginous" (ochraceous tawny to buckthorn brown), pores 5 in 1 mm., setae not seen .. .. 359. *Poria Carteri.*

Closely adherent, thin to 4 mm. thick, wood brown to cinnamon brown, darker when old, pore mouths glancing, 6 to 7 in 1 mm., spores 3.5 to 5 μ, setae none or few, 6 x 3 μ, 26 x 7 μ .. .. 360. *Poria brunneo-adherens.*

Thin, surface light-coloured (between chamois and warm buff) becoming tawny olive, ochraceous tawny on section, pores oblique, lacerated, 3 in 1 mm. .. .. 361. *Poria luteo-fulvus.*

Spores definitely brown.

Thin, Argus brown, light in weight, pores large, irregular, 2 to 3 in 1 mm., spores tawny brown, 5.5 to 7.5 x 3.7 μ .. .. 362. *Poria tasmanica.*

III. Hyphae livid brown (more or less fuscous).

Extensive, thick (up to 7 mm.), surface dingy pallid, becoming fuscous to drab and blackish-fuscous when old, substance purplish fuscous, spores 5 x 3.5 μ .. .. 306. *Fomes lividus* (usually resupinate).

IV. Hyphae not deeply coloured.

Merulius or meruloid.

Merulius, sterile surface extensive, curling up at edges, whitish, reticulations flesh colour, pale tan or ochraceous tawny .. .. 386. *Merulius corium.*

Meruloid, variable, richly coloured (vinaceous cinnamon to brown) .. .. 363. *Poria merulina.*

Merulius, pure white with tendency to brownish discoloration, pores very shallow, orifices rather large .. .. 387. *Merulius candidus.*

Irpiciform.
Cinnamon drab to vinaceous drab, when old dark violaceous grey, edges villose to almost byssoid .. .. 333. Resupinate forms of *Polystictus* (*Irpex*) *versatilis*.

Pore mouths relatively large, 0.5 mm. or more, edge determinate, colour pallid buff .. .. .. 364. *Poria subserpens*.

Plants more or less brightly coloured with pink, scarlet, orange, or apricot.
Definitely vinaceous pink .. .. 365. *Poria vinaceo-rosea*.

Scarlet to salmon orange .. .. 335. Resupinate forms of *Trametes cinnabarina*.

Apricot-coloured (capucine buff, capucine orange), thin, orifices readily recognisable to naked eye .. .. 366. *Poria Archeri*.

Orange-tinted (warm buff, ochraceous buff, paler than capucine orange) including subiculum, relatively thick (up to 4 mm.), sometimes stratose .. .. 367. *Poria subaurantiaca*.

Sterile edge white, contrasting with the brown (Verona brown, warm sepia, bone brown, army brown) pore surface .. .. 383. Resupinate forms of *Gloeoporus dichrous*.

Tawny olive .. .. 339. Poria-like forms of *Trametes protea*.

Spores brown, 8 to 10 x 6.5 to 7 μ, pores dark brown, up to 2.5 mm. deep, sterile edge dirty whitish often with tints of orange, causing a dry rot .. .. 368. *Poria incrassata*.

Spores white, large, 13 to 15 x 4.5 to 6.5 μ, usually abundant, plants buff to clay colour, sterile edge white or whitish, variable, sometimes with raised edges, pores usually very oblique .. .. 369. *Poria macrospora*.

Spores white, usually abundant, oval or elliptical, 6 to 9 x 4 to 7 μ. Cutting like firm cheese when fresh, often with a phosphorus smell, usually inside burnt trunks, creamy-white becoming brownish, hyphae thick, soon attacked by insects, spores 6 to 7 x 4 to 6 μ .. .. .. 370. *Poria dictyopora*.

Firmer, whitish to light buff becoming brownish, determinate, often extensive, not specially attacked by insects, spores thick-walled, 6.5 to 9.5 x 5.2 to 7.5 μ .. .. 371. *Poria medulla-panis*.

Hyphae very broad, up to 7.5 μ, very irregular, thick-walled, plants white with a cinereous tinge, up to 5 mm. thick .. .. 372. *Poria Wakefieldii*.

Corky-tough, rather thick (2 to 5 mm.), pallid to pale buff, rather soft to the touch, pores usually oblique, stratose, orifices 4 to 7 in 1 mm. .. 373. *Poria subcrassa*.

Pores rather large, 2½ to 3 in 1 mm., shallow, becoming snuff-brown, margin whitish, smooth, separating .. .. 374. *Poria westraliensis*.

Buff tints distinct.
In parts at least definitely irpiciform. Indeterminate, pinkish buff, light ochraceous buff or cinnamon buff, orifices usually 0.2 to 0.4 mm. wide, readily recognisable to naked eye .. .. 344. *Irpex obliquus*.

Orifices regular, true *Poria*. Indeterminate, pinkish buff or cinnamon buff, edge paler, orifices 3 to 6 in 1 mm. .. .. 375. *Poria selecta*.

Pinkish buff to buffy whitish, orifices minute.

Edge white becoming smooth, orifices 7 in 1 mm. .. .. 376. *Poria minutipora.*

Edge like pore-surface or paler, orifices 5 in 1 mm. .. .. 377. *Poria carneo-lutea.*

Pores sub-hyaline in appearance, whitish to dingy whitish to ochraceous buff, orifices 4 to 8 in 1 mm. .. .. 378. *Poria hyalina.*

Hard, chalky white to light buff, indeterminate, intimately adherent, orifices minute, about 6 in 1 mm. .. .. 379. *Poria calcea.*

Purplish to vinaceous drab in parts, elsewhere often pale buff to tawny olive, pores at first meruloid, indeterminate .. .. 380. *Poria purpurea.*

Vinaceous flesh colour usually present, when thick throughout the substance, when thin often shades of cinnamon with paler edge, thin to thick, orifices minute, 6 to 11 in 1 mm. .. .. 381. *Poria vincta.*

Pallid ochraceous, becoming ochraceous salmon and finally dark near burnt umber, tubes up to 2 mm. deep, orifices about 6 in 1 mm. .. .. .. 382. *Poria attenuata.*

I. Hyphae dull yellowish. General colour of plants, old gold.

349. **Poria setuloso-crocea** Clel. et Rodw. (L., *setulosus*, bearing small bristles; *croceus*, yellow, more particularly a saffron yellow, in reference to the general colour).—Forming irregular closely adherent patches, up to 7 cm. x 1 cm., in the irregular interstices of bark and the surface of decaying wood, in colour paler than Old Gold (XVI.), near to but paler than Isabella Colour (XXX.). The very thin sterile mycelium before the pores form approximates to the same colour and is granular or villous looking. Thickness up to 1 to 1.5 cm., the tubes browner than the surface colour, context practically absent, resting on the mycelium-penetrated substratum. Pores very minute, a little irregular in size, about 6 to 7 in 1 mm., dissepiments rounded. Spores fairly numerous, elliptical, one end more pointed than the other, 5.5 to 6 x 3.7 μ. Hyphae slightly but definitely tinted yellowish or brownish yellow. Long narrow acuminate deep brown setae, 165 to 190 x 8 to 11.5 μ. South Australia—Causing rotting of the stump of a Pepper-tree (*Schinus Molle* L.), Fullarton, near Adelaide. July.

350. **Poria crocea** Pers. (as *Polyporus*) (L., *croceus*, saffron yellow).—Forming patches 4 or more cm. in diameter and up to 5 mm. thick, in colour near Old Gold (XVI.) or lighter or darker, zoned on the under surface, sterile margin free, byssoid, broad and obtuse. The tubes are 2 to 4 mm. long, the subiculum definite but thin. The orifices are irregular, vary in size, about .3 mm. in diameter, usually about 2 to 2½ in 1 mm., sometimes broken into lrpex-like teeth. Hyphae definitely yellowish, usually about 4 μ in diameter, a little irregular, setae not seen. Tasmania. July.

Not yet recorded for South Australia.

II. Hyphae yellowish-brown and hence the substance brown of various shades.

A. Setae present and readily demonstrable.

351. **Poria Victoriae** Berk. (After the State of Victoria).—Forming small irregular patches 1 to 2 cm. long, 1 to 2 mm. thick, Wood Brown (XL.) in colour, in the hollows of the rough bark of an Eucalypt. Pores mostly oblique from the upright position, orifices very minute, about 3 to 4 in 1 mm., a little irregular in size, the thin dissepiments rounded. Hyphae yellow-brown, rather thick-walled, slightly wavy, 3.5 to 4 μ, setae brown, acuminate with blunt apices, about 45 x 9 μ, not very numerous. Spores hyaline, probably 7 x 3.4 μ. New South Wales. Not yet recorded for South Australia.

352. **Poria contigua** Pers. (L., *contiguus*, adjacent).—Forming thin patches (in our specimens) up to 12 x 4 cm. but usually less and about 1.5 mm. thick, Snuff Brown to Bister (XXIX.) with relatively large pores (about 3 in 1 mm.),

yellow-brown hyphae, 2.5 to 3.7 μ, and thorn-like acuminate brown setae with broadened bases 18 to 45 x 5 to 9 μ. In growing plants the narrow edge is paler and velvety, and in old plants the colour may be darker than bister. South Australia—Mount Lofty ? and locality unrecorded. New South Wales. Tasmania.

These plants do not quite agree with English (Rea) or French (Bourdot and Galzin) descriptions of this species where the colour appears to be more bright (tawny cinnamon, umber cinnamon), the subiculum thicker (0.5 to 1 mm.), and the plants themselves up to 12 mm. thick.

353. **Poria ferruginosa** (Schrad.) Fr. (*Fomes ferruginosus*) (L., *ferruginosus*, rust-coloured).—This species is described as being bright rusty, then rusty brown, the subiculum 1 mm., the trama light (not heavy), the tubes cinnamon, 2 to 6 mm. long, the pores rusty-brown, 4 to 5 in 1 mm., spores 4.5 to 5 x 2.75 to 3.4 μ, cystidia abundant, deep brown, 30 to 50 (to 150) x 6.8 μ. A specimen forming a thin crust-like layer, darker than Tawny Olive (XXIX.), on old mycelium, with 5 to 5½ pore mouths in 1 mm. and with a few dark brown acuminate setae with broadened bases, 27 x 7 μ, is referred to this species. New South Wales—Bulli Pass. November.

354. **Poria laevigata** Fr. (L., *laevigatus*, made smooth).—Forming a circumscribed raised growth 12 x 5.5 cm., Drab (XLVI.), Wood Brown (XL.) in certain lights, the rather broad sloping nearly smooth to subtomentose sterile edge between Wood Brown and Buffy Brown (XL.), the context near Brussels Brown (III.). It is intimately attached to the subjacent bark, in the centre being about 5 mm. thick or 7 to 8 mm. if the infiltrated outer bark be included. The pores are oblique, minute, about 5 to 6 in 1 mm., dissepiments rounded, spores hyaline, oval, 6.5 x 4.8 μ. Hyphae brown, about 3.5 μ. A few brown acuminate setae, 19 to 30 x 7.5 μ. South Australia (probably).

355. **Poria sublaevigata** Clel. et Rodw. (*Sub*, here near the species *P. laevigata* Fr.).—Forming patches up to 12 x 2 cm., with outlying small pore-bearing islands 2 or 3 mm. in diameter, up to 4 mm. thick in the centre, shelving to the edge which is fairly sharply defined and in the growing part outlined by a narrow paler more gilvous zone near Buckthorn Brown (XV.). Pore surface glancing with the angle of light, paler than Dresden Brown (XV.) to much darker when old. Occasional sterile patches sometimes as a peripheral rim, subtomentose (microscopically finely strigose). Subiculum practically none. Cut surface wood-colour, not so dark as in *P. laevigata*. Orifices about 5 to 6 in 1 mm., dissepiments thin, microscopically strigose. Spores hyaline, subspherical, oblique, with a large gutta, 6.8 x 5.2 μ. Hyphae yellow brown, 4 μ. Setae dark brown, varying much, slightly curved or straight, acuminate, with ventricose bases, 19 to 35 x 5 to 7.5 μ. On small branches. New South Wales.

356. **Poria uncinata** Weir (L., *uncinatus*, armed with hooks, in reference to the setae).—Forming raised masses 9 x 5 cm. or more in size and 1.5 cm. thick, the edges raised and subdeterminate, in colour a little darker than Brussels Brown (III.), on section more gilvous in parts and near Antique Brown (III.), covering the charred surface of an old stump. The fungus is moderately heavy, not extremely light. Sterile portions are subvillose. Tubes mostly short (about 2 mm.) and the subiculum considerable passing into the interpenetrating mycelium. Orifices minute, about 4 to 5 in 1 mm., a little angular, dissepiments rather rounded. Spores hyaline, subspherical, 5.5 x 3.7, 3.5 μ. Hyphae yellow-brown, thick-walled, calibre a little irregular, usually about 2.5 μ, sometimes 3 μ. Setae dark brown, thorn-like, with broad, sometimes flattened bases and acute or blunt ends, sometimes definitely hooked, thick-walled, 17 to 30 x 5 to 7.5 μ at the bases. New South Wales. March.

357. **Poria subweirii** Clel. et Rodw. (*Sub*, here near the species *P. Weirii* Murrill).—Forming extensive patches, 10 cm. or more in extent, up to 20 mm. thick in the centre, thinning to 1 or 2 mm. at the edge, subdeterminate, the tubes usually forming most of the thickness, near Argus Brown (III.), the context gilvous near Buckthorn Brown (XV.). Orifices of the tubes about 2½ in 1 mm., irregular, the thin dissepiments often defective so that one orifice is continuous with a neighbour. In the substratum and also in the tubes, whitish hyphal strands (perhaps adventitious) are interspersed in the gilvous matrix. Setae brown, long, pointed, 64 to 72 x 8 μ at the base. Spores not seen. South Australia—On dead *Casuarina stricta* Ait., Mount Dutton, E.P. May.

B. Setae absent or few and hard to find.

358. **Poria Friesiana** Bres. (After Elias Magnus Fries, 1794-1878, the eminent Swedish mycologist).—"Widely extended, 5 to 20 cm., in a plague or pad, 0.5 to 2.5 cm., the subiculum thin or almost none, bright cinnamon to umber cinnamon, the border almost none or pubescent fawny cinnamon, the tubes stratified up to 7 mm. long, the pores fine, 4 to 5 in 1 mm., rusty cinnamon, umber or tobacco-coloured with a greyish pruinosity, hazel, mycelium pale fawn or sulphur, spinules usually absent, spores hyaline, then pale cream, subglobular, 6.5 to 8 x 5 to 6.8 μ. The spores when long in the tubes may become brownish."—Bourdot and Galzin.

In Australia, this is a variable species forming usually thin patches, 1 to 3 mm. thick and up to 12 x 2.5 cm. in size, sometimes thicker plaques up to 7 mm. thick with the tubes stratose, the border often fairly defined and slightly raised, sometimes with outlying islands, the sterile edge almost absent or narrow and pubescent, the pores often oblique, when horizontal minute, 4½ to 5 in 1 mm., in colour near Sudan Brown (III.) or more gilvous, the older pores becoming darker near Brussels Brown (III.), sometimes very dark, the hyphae yellow brown, sometimes varicose, 2 to 4.2 μ thick, spores subspherical or subspherical triangular with a small gutta, 6 to 7 x 5 to 5.5 μ, 5.5 to 6.5 μ, usually hyaline but often slightly, sometimes decidedly, brown, two doubtful setae seen. Tasmania. New South Wales. Victoria. June to August.

359. **Poria Carteri** Berk. (A surname).—"Ferruginous, effused, very thin, light, with the margin scarcely strigose, the tubes short, pores punctiform, round, equal, very minute, the dissepiments thick. The pores much smaller than any other of the ferruginous species."—Berkeley.

An Australian specimen from Katoomba, New South Wales, December, forms a thickish hard adherent patch, about 6 x 5 cm. and 6 mm. thick in the centre, Ochraceous Tawny to Buckthorn Brown (XV.), the tubes oblique, the pores very fine about 5 in 1 mm., the subiculum less than half the thickness, hyphae yellow-brown, usually about 3 μ, setae not seen. Specimens from Bunya Mountains, Queensland, form large thick patches, 10 cm. or more long and up to 1.5 cm. thick, *Fomes*-like, consisting mostly of the pores, the context relatively narrow, the tubes near Argus Brown (III.), the orifices Warm Sepia to Bister (XXIX.) and darker. The tubes are 7 to 13 mm. deep, the orifices nearly sealed up and very minute, about 6 in 1 mm., regular, the dissepiments rather rounded. The plant shelves towards the determinate edge with a broad sterile almost crusted surface of the same colour as the pore orifices and up to 2 cm. wide. Hyphae yellow-brown, thick-walled, 2.5 to 3 μ in diameter. Setae not seen. Spores white, subspherical, 5 to 6 μ.

360. **Poria brunneo-adherens** Clel. et Rodw. (L., *brunneus*, brown; *adherens*, adhering, in reference to the attachment).—Forming extensive (10 to 20 cm.) brown determinate patches intimately adherent to the underlying wood and very difficult to detach, thin at the periphery but in old plants up to 4 mm. thick in the centre. The colour varies as viewed from different angles and reflected by the glancing mouths of the tubes from near Wood Brown (XL.) or lighter than Cinnamon Brown (XV.) to darker than Prout's Brown (XV.), when old becoming a very dark brown, on section near Cinnamon Brown. Pores exceedingly minute, about 6 to 7 in 1 mm., often oblique, shallow near the edge, the dissepiments thin and not setulose. Subiculum very thin, most of the substance being composed of the old filled tubes. Hyphae yellowish-brown, 2.5 to 4 μ. Occasional short, acuminate, dark brown setae found (6 x 3, 11 x 4, 30 x 7 μ, etc.). Spores hyaline, subspherical, 5 x 3.7 μ. Forming extensive patches on the undersides of old logs. South Australia—Inman Valley, National Park. January, July, August.

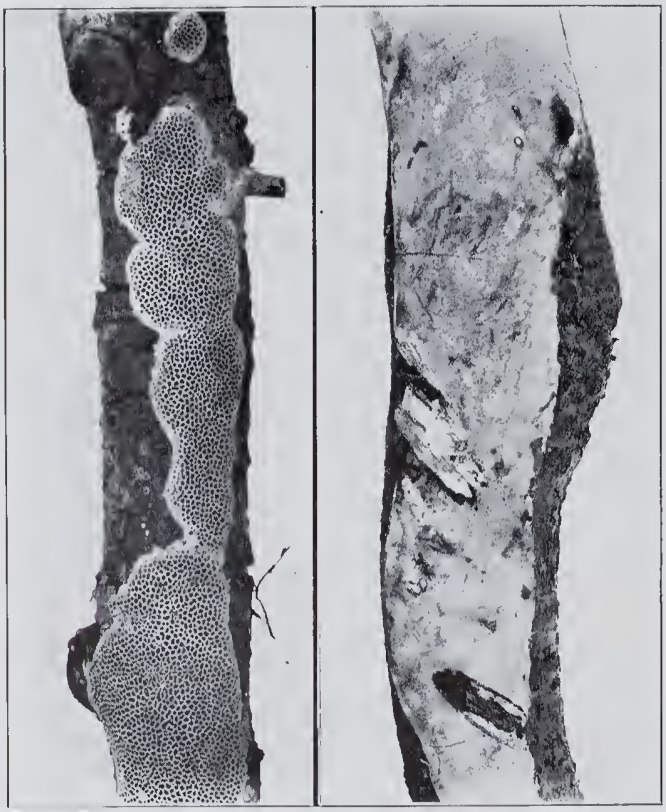
The chief characteristics of the species consist in the extensive intimately adherent dull brown patches becoming very dark when old, in the minute size of the pores and their glancing mouths and the difficulty in finding the short dark brown setae. The specific name refers to the colour and to the intimate adherence of the plant to the underlying matrix.

361. **Poria luteo-fulvus** Clel. et Rodw. (L., *luteus*, pale yellow; *fulvus*, tawny).—Forming patches up to 12 x 2 cm., up to 2 mm. thick, the surface between Chamois (XXX.) and Warm Buff (XV.), becoming Tawny Olive, on section Ochraceous Tawny (XV.), the pores very oblique, lacerated, about 3 in 1 mm. The substance turns brown when bruised. Hyphae yellow brown, thick-walled, rather irregular in calibre, 4 to 6.5 μ. Australia.

362. **Poria tasmanica** Cleland et Rodw. (*Tasmanica*, Tasmanian).—Forming a thin patch, about 3 x 2 cm. in size, up to 5 mm. thick in the centre, the edges somewhat raised in places and velutinate, very light in weight and soft to the touch, near Argus Brown (III.), the tubes about 2.5 mm. deep, the subiculum about the same, the pores large and varying in size, 2 to sometimes 3 in 1 mm., the dissepiments thin and fibrillose, hyphae brown and up to 5.5 μ thick, spores tawny brown, oblique, flatter on one side, 5.5 to 7.5 x 3.7 μ, setae not seen. Tasmania.

III. Hyphae livid brown, more or less fuscous.

Vide 306, *Fomes lividus*.



[*Photos. by G. Samuel.*

Figure 52.—**Left:** *Poria subserpens* **Murr. (No. 364). New South Wales. Right:** *Poria medulla panis* **(Pers.) Fr. (No. 371). New South Wales. Reduced by ¼.**

IV. Hyphae not deeply coloured.

363. **Poria merulina** Berk. (From the resemblance to the genus *Merulius*).—Forming extensive very thin patches up to 12 x 4 cm. or more, often with outlying islands, on the usually burnt trunks of living stringy-bark Eucalypts or on dead wood, varying considerably in colour even from the same locality, with a fairly determinate wavy and irregular paler sterile edge, the surface often irregular following the underlying roughness of the surface on which it is growing, separable as a slightly tough pellicle. The hymenial surface varies in colour, being near Sayal Brown (XXIX.) and Light Vinaceous Cinnamon (XXIX.) or a vinaceous brown near Army Brown (XL.) and Sorghum Brown (XXXIX.) or Liver Brown (XIV.). The younger portions may be more ochraceous than Orange

Buff (III.), the edge being pallid and sometimes in striking contrast. In the Sorghum Brown and Army Brown specimens there is a line of Light Pinkish Cinnamon (XXIX.) inside the paler edge and in the Liver Brown plants a zone near Hazel (XIV.). The edge is finely villose to nearly byssoid. The pores are very irregular, small, from about .2 to .8 mm. in diameter, about 3 in 1 mm., meruloid and shallow or oblique or a little deeper and *Poria*-like with the dissepiments rounded and relatively thick and sometimes defective. Spores ? slightly curved, 5 x 1.8 μ. Hyphae white, irregular, septate, 3 to 5 μ in diameter. South Australia—On living trunks of *Eucalyptus obliqua* L'Herit., Mount Lofty. New South Wales. March, June, and August.

364. **Poria subserpens** Murr. (L., *subserpens*, somewhat creeping).—Descriptions, which differ somewhat, of two Australian collections are the following:—(1) Forming sharply determinate, irregular patches from 0.5 cm. up to 9 x 2 cm. in size, with somewhat raised edges and of a pallid dirty buffy tint (near Pinkish Buff and Ochraceous Buff, XXIX.), about 1 mm. thick with context very thin. The pores are rather hexagonal, up to about 1 mm. wide with thin dissepiments. Hyphae white, 3 to 3.7 μ thick, varying a little in calibre and with occasional nodular projections. (2) Forming sharply determinate neat-looking raised patches up to 15 x 2 cm., of a pale buff colour (a little darker than Pinkish Buff, XXIX.), about 1 mm. thick, with very thin context and very narrow sterile edge of the same colour. Pores rather hexagonal, regular, about 0.5 mm. wide, about 8 in 5 mm., the dissepiments thin and a little rounded. Hyphae white, a little wavy and varicose, 2 to 3 μ in diameter. New South Wales—Bullahdelah, Malanganee. August. (Figure 52. Left.)

365. **Poria vinaceo-rosea** Rodw. et Clel. (L., *vinaceus*, wine-coloured; *roseus*, rosy).—Forming thin encrusting patches up to 10 cm. or more, covering the lameflae of decaying *Leuzites repanda* Mont., and tending to fill up the spaces, a little greyer than Vinaceous Pink (XXVIII.) becoming Terra-cotta (XXVIII.) or darker. The growing narrow sterile edge is filmy and subarachnoid. Thickness up to 1 mm. Pores very minute, about 4 in 1 mm., orifices rounded, varying slightly in size, dissepiments obtuse, rounded. Rather friable. Hyphae with a faint tinge of yellow, 2.5 to 5.5 μ. Spores not seen. Queensland—Bunya Mountains. October.

366. **Poria Archeri** Berk. (After William Archer, 1820-1874, F.L.S., a member of the first Legislature of Tasmania in 1851, later a Minister of the Crown and Secretary of the Royal Society of Tasmania, an assiduous botanical collector to whom with Gunn Hooker dedicated his "Flora of Tasmania").—Widely effused, apricot-coloured (deeper than Capucine Buff, III.; more buff than Capucine Orange, III., the edge paler; Ochraceous Buff, XV.; between Ochraceous Buff and Ochraceous Orange, XV., darker in places; near Cinnamon, XXIX., faded in parts; Light Ochraceous Salmon, XV., Light Vinaceous Cinnamon, XXIX., to Pinkish Cinnamon, nearly Cinnamon), soft to the touch, vegetative stratum dense of closely felted mycelium about 0.7 to 1 mm. thick, texture somewhat *Xylostroma*-like margin sterile, narrow, dense, byssoid, paler. Tubes shallow, mostly 0.5 mm. deep, dissepiments very thin, irregular, edge setaceous, very irregular and lacerated, pores irregular, about 4 in 1 mm., very oblique where the fruit body is not quite horizontal. When growing in very wet places it is often paler and the sterile border wider. Tasmania. January, May, July.

367. **Poria subaurantiaca** Rodw. et Clel. (L., *subaurantiacus*, somewhat orange).—Forming rather indeterminate patches, sometimes with an obtuse upturned margin, up to 7 x 5 cm. in size, of a pale dull orange tint (Warm Buff, XV., to Ochraceous Buff, XV., or paler than Capucine Orange, III., the ochraceous buff appearing on the under surface), rather soft to the touch, up to 4 mm. thick. Subiculum very thin, the total thickness composed chiefly of the pores which may be stratose. Pores oblique, about 3 in 1 mm., the orifices a little polygonal, dissepiments rather thin, thicker when the tubes are very oblique. Tasmania. New South Wales. March.

368. **Poria incrassata** (B. et C.) Burt. (L., *incrassatus*, fattened, made stout).—This is a species causing a "dry rot" in the United States and considerable economic loss in lumber and building wood. It is characterised by dusky-brown spores, 8 to 10 x 6.5 to 7 μ in size. The pore-surface when formed cracks widely in drying and becomes brownish to blackish-brown, contrasting with the broad sterile dirty-whitish, sometimes orange-tinted, margin.

When fresh and exposed to light, the fruit-bodies may vary from orange to pale olivaceous. The mycelium may form extensive fan-shaped sheets, whitish when young, tinged yellowish-olive to brownish when older. Rhizomorphs may be present. A *Poria* found on the underside of rotting imported softwood in a kitchen sink, Neutral Bay, Sydney, may have been this species. It has not been recorded for South Australia.

369. **Poria macrospora** Rodw. et Clel. (Gr., *makros*, long; *spora*, seed).—At times forming long patches, up to 6 cm. in length, of white sterile subiculum, fairly sharply defined but very thin at the edge, which is not raised, the pores appearing first as faint raised meruloid reticulations, at first white, deepening to buff as they become older, when they are usually oblique from their situation, only in projecting parts pore-like. At other times forming determinate patches up to 7 x 3 cm. with raised sterile tomentose edges, tending naturally to separate a little from the substratum round the periphery but not easily separable artificially, corky, 1 mm. thick, consisting almost entirely of the tubes. The pore-bearing surface is darker than Pinkish Buff (XXIX.), the narrow edge being much paler, of the same tint though nearly white; when old the surface approaches Clay Colour (XXIX.). In other specimens the colour is near Pinkish Buff becoming Cinnamon Buff or near Clay Colour on a whitish background. In still other collections on the rough bark of Eucalypts, the plants appear as little patches, a few millimetres to several centimetres in size, occupying the interstices or spreading over them and bearing pores even when very small. The pores are usually very oblique, sometimes almost irpicoid and when not oblique, as on a rounded edge, shallow and nearly hexagona-like, the orifices 0.5 to 1 mm. wide, dissepiments thin, not jagged. Spores white, elongated, with an oblique apiculus and oval gutta, 13 to 15 x 4.5 to 6.5 μ; hyphae irregular, sometimes much so, sometimes curly, usually in short lengths, tending to break up into granules, 1.5 to 4 or 5 μ thick. South Australia—Encounter Bay, Hindmarsh Valley, National Park, Morialta (at the base of *Leptospermum pubescens* Lamk.). January, May.

This species, as indicated in the description, is variable, and were it not for the characteristic very large spores and the fact that bridging forms between the extremes may be found in one collection, these extremes might be thought to be distinct species. The large spores are usually readily found and "hall-mark" the species. It may be added that we have hitherto not found any species of Australian *Polyporus* with corresponding spores, so this *Poria* is not likely to be a resupinate form of a *Polyporus*. The large spores do suggest, however, *Hexagona Gunnii* and to some extent the two species otherwise may resemble each other, in fact, so much so that it is quite possible that they are closely related phylogenetically. The pores of *Hexagona Gunnii* are however typically very large, the context has a darkish tint, and the plants form projecting masses. Occasionally one meets with little pustules a few millimetres in size with the pores rather smaller, but nevertheless decidedly larger than those of the *Poria*, but in such specimens the pustule forms quite a little knob and the smoky brown context can be recognised. In the *Poria*, the supposed relationship may be seen also in a slight tendency for the orifices to be hexagonal.

370. **Poria dictyopora** Cke. (Gr., *dictyon*, a network; *poros*, a pore).—Forming extensive patches, tending to be circular, from a few inches up to nearly 1 square foot in area, when fresh soft and cutting like firm cheese, becoming rigid when dry and then tending to coil up, usually with a distinct smell of phosphorus and often exuding drops of moisture, remaining moist for long, occurring usually on the inside of charred stumps and burnt hollow trunks (usually, if not always, on Eucalypts), occasionally when near the ground encrusting irregularly leaves, sticks, stones, and debris. The tubes creamy white or greyish cream with brown tints as if scorched, becoming brownish to dirty dark brownish when dry. The context when fresh whiter than the tubes, 1 to 2 mm. thick, with occasional specimens much thicker (up to 7 mm.). With a subdeterminate raised tomentose edge. The pore-bearing surface is very shallow up to 1.5 mm. thick, the whitish subiculum forming usually most of the thickness. Developing specimens may show extensive smooth patches on which islands of pores, often vertical, are appearing. Tubes when vertical often irpiciform with the front wall absent and with thin dissepiments on each side, up to 0.5 cm. long, or the dissepiments as parallel narrow ridges up to 1.5 cm. long. When more horizontal, the pores are very shallow meruloid pits (about $2\frac{1}{2}$ in 1 mm.) or a little deeper with thin dissepiments. Spores numerous, white, oval or pear-shaped, 6 to 7, occasionally

5 to 9.5 x 4 to 6 μ. Hyphae white, thick-walled, knobby, very irregularly bent, branching at various angles, 5.5 to 11.5 μ. Usually on charred stumps or on the inside of burnt trunks, occasionally at the base of a stump and extending over surrounding pine-needles, etc. South Australia—Mount Lofty, National Park, Kuitpo. New South Wales. April to July.

371. **Poria medulla-panis** (Pers.) Fr. (L., *medulla*, pith, crumb; *panis*, bread).—Forming extensive, fairly sharply determinate, firmly adherent patches up to 30 x 5 cm. in size and 1 to 5 mm. thick, sometimes cracking on the surface. In colour Light Buff (XV.), or between this and Warm Buff (XV.), or Light Buff becoming warmer when bruised, or the surface white with a tinge of Light Buff with the context Warm Buff and becoming Warm Buff when bruised, when old with darker stains and often with a dark brown or scorched brown edge tending to be cracked, the surface in some cases turning yellowish or mustard colour on scratching or bruising and brownish when emulsified. The sterile edge may be narrow or more extensive, depending on the age, and in one case we have an extensive very thin white patch, 10 x 1.5 cm. in size, of sterile surface on which here and there very minute shallow pits are developing whilst another branch collected at the same time had the pores well-developed but in a thin layer. The pores are up to 3 mm. long, straight and shallow, or oblique, with very little context which is whitish and passes into the white mycelium penetrating the wood. The pore orifices are very minute, about 3 to 4 in 1 mm., the dissepiments thin when growing obliquely, rounded and nearly the diameter of the pores when horizontal. The spores are abundant, sometimes forming most of the hymenial substance in teased scrapings, whitish or very slightly tinted, thick-walled, oval or elliptical, 6.5 to 9.5 x 5.2 to 7.5 μ. Hyphae whitish, irregular, sometimes varicose, sometimes collapsed-looking, branching irregularly, 1.8 to 3.5 μ thick. On dead branches and fallen wood. South Australia—Mount Lofty (on dead *Banksia marginata* Cav.), National Park, Hindmarsh Valley. New South Wales. Flinders Island, Bass Straits. New Zealand. Europe, etc. January to May, July to September. (Figure 52. Right.)

372. **Poria Wakefieldii** Rodw. et Clel. (After Miss E. M. Wakefield, of the Royal Botanic Gardens, Kew).—White with a cinereous tint, becoming discoloured a dingy grey near the surface probably from commencing decay. The thickness is up to 5 mm., consisting chiefly of the pores (3.5 mm. deep), beneath which is a thin tomentose whitish subiculum up to 1 mm. thick. The orifices are minute, 0.16 to 0.25 mm., about 3½ to 6 in 1 mm., rather angular, the dissepiments thin and acute or somewhat rounded. The hyphae are thick-walled, very irregular, sometimes curved or knobby, with the calibre varying in individual hyphae, 2.5 to 7.5 μ thick, with smaller fragments of mycelium about 2 μ thick, with branches coming off irregularly, some at right angles and some at acute angles. New South Wales. September.

373. **Poria subcrassa** Rodw. et Clel. (L., *subcrassus*, somewhat thick).—Forming adherent patches up to 7.5 x 4 cm., rather thick (2 to 5 mm.), Pale Pinkish Buff to Pinkish Buff (XXIX.), Light Buff (XV.) or approaching Warm Buff (XV.), corky-tough, usually rather soft to the touch, pores stratose, usually forming most of the substance, sometimes with a thin context layer. Pores often oblique, orifices 4 to 7 in 1 mm., dissepiments rather thick, setulose. Hyphae rather wavy and somewhat varicose, 2 to 3.5 μ, usually about 2.5 μ, spores not seen. Tasmania.

The species approaches *P. medulla-panis* Pers., and *P. pulchella* Schw., which is sometimes considered a thin variety of the former (*vide* Bourdot et Galzin). It differs from Australian specimens of *P. medulla-panis* in being usually rather soft to the touch and thicker, the pores more frequently oblique, the orifices reaching to a smaller size and the absence of the abundant oval spores of *P. medulla-panis*.

374. **Poria westraliensis** Rodw. et Clel. (*Westraliensis*, Western Australian).—Forming sharply defined patches, 8.7 x 1.8 cm. or less, with edges separating from the substratum, nearly membranous, with a broad smooth sterile margin which is whitish with a slight buffy tint. On this the shallow pores develop, becoming near Snuff Brown (XXIX.), rather large, 2½ to 3 in 1 mm., regular, dissepiments thin, not setulose. Hyphae pallid, thick-walled, 3 to 4.5 μ. Spores not seen. Western Australia.

375. **Poria selecta** Karst. (L., *selectus*, choice, select).—Forming irregular patches, 10 x 2 cm. in size, near Pinkish Buff (XXIX.) or greyer, semi-detachable, with a broad irregular indeterminate felted-fluffy nearly whitish margin, very thin, rarely nearly 1 mm. thick, pores about 0.25 mm. deep, orifices variable, somewhat angular, 0.1 to 0.32 mm. wide, 3 to 5 in 1 mm., dissepiments thin, smooth. Spores 5.5 x 2 μ. Hyphae septate, irregular, sometimes varicose, branching at right angles, 2.5 to 4, rarely 7, μ wide. South Australia—Near Ashbourne, Mount Lofty. New South Wales. Tasmania. February, April, May, July, August.

There is doubt as to the correct identification of this variable species, some specimens of which seem to grade into *Irpex obliquus*.

376. **Poria minutipora** Rodw. et Clel. (L., *minutus*, diminished, minute; Gr., *poros*, a pore).—Forming extensive patches up to 10 x 5 cm. or more, more dingy and in places darker than Pinkish Buff (XXIX.) with a sheen, rather silky-soft to the touch, 1 mm. thick, consisting chiefly of the pores with a thin layer of white byssoid subiculum, indeterminate, with in parts a narrow or more extensive sterile byssoid or quite smooth white edge. Pores 0.7 mm. deep, orifices 0.1 mm. diameter, 7 in 1 mm., dissepiments thin, rounded, edges tending to be setose or jagged. Hyphae 2 to 3 μ thick, rather irregular, white. New South Wales. Tasmania. Not yet recorded for South Australia.

377. **Poria carneo-lutea** Rodw. et Clel. (L., *carneus*, flesh-coloured; *luteus*, pale yellow).—Irregularly effused forming a thin crust-like layer, not readily separable, Pinkish Buff (XXIX.), the growing edge narrow, of the same colour or a little paler and finely pilose, up to 1 mm. thick, corky to subfriable, tending to crack, pores 0.5 mm. deep, orifices 0.1 to 0.32 mm. wide, usually under 0.24 mm., 4 to 5 in 1 mm., the edges pilose and not ragged, dissepiments rounded and 0.05 to 0.1 mm. thick, substratum almost negligible, spores not seen, hyphae faintly tinted yellowish, rather irregular, 2 to 3.7 μ. New South Wales. Not yet recorded for South Australia.

378. **Poria hyalina** Berk. (Gr., *hyalos*, a clear transparent stone, glass).—A specimen from Orange, New South Wales, identified by Miss E. M. Wakefield of the Royal Botanic Gardens, Kew, forms a somewhat circumscribed thin patch with an indefinite edge, between Clay Colour and Tawny Olive (XXIX.), in places darker than the latter, composed of the very small obliquely set pores presenting a somewhat translucent appearance (like dried gristle) resting on a very thin whitish subiculum. The surface tends to split. The thickness is about 1 mm. The orifices are closely set, about 6 in 1 mm., with thin dissepiments. Hyphae nearly colourless, 2 to (usually) 3.7, occasionally 4.2 μ, calibre a little irregular. South Australian specimens referred to this species agree in the minuteness of the pore orifices and a sub-hyaline appearance of the pore surface but present a deeper colour (ochraceous buff, cinnamon buff). Specimens from Kuitpo form small patches about 2.5 x 1.5 cm. in size, with pallid felted edges contrasting with the pore-bearing surface which is between Ochraceous Buff and Ochraceous Orange (XV.), later approaching Ochraceous Tawny (XV.). Tubes about 1 mm. deep, forming most of the thickness, orifices about 0.1 mm. wide, about 9 in 1 mm., honeycomb-like and rather polygonal, sometimes fluted, dissepiments very thin. South Australia—Kuitpo, Coromandel Valley, Mount Lofty, Mount MacIntyre (S.E.). New South Wales. Tasmania. May, June, October to December.

379. **Poria calcea** Berk. et Br. (L., *calx*, *calcis*, a chalk stone).—Forming extensive hard but brittle patches, up to 20 x 8 cm. in size, Light Buff (XV.) or a little darker in colour, rather than "chalky white," under 0.5 to 1 mm. thick, densely adherent to the substratum. The pores are very minute, usually about 6 in 1 mm., 0.174 to 0.260 mm. in diameter, and very shallow, the orifices rather polygonal and the dissepiments very thin. When developed, the pores may form about half of the total thickness, but even in large patches are often not much more than raised reticulations, with the dissepiments occasionally defective. On dead decaying wood, sometimes penetrating through thin superficial layers, and appearing below, where separation occurs, as a tenuous pallid indeterminate film on which the minute spores soon appear. Hyphae white, in short lengths, slender, 1.5 to 2.5 μ. Queensland. New South Wales. Not yet recorded for South Australia.

380. **Poria purpurea** Fr. (L., *purpureus*, purple).—Forming small to extensive thin adherent ill-defined patches sometimes 8in. (20 cm.) or more long, with the pores at first meruloid, and in which vinaceous purple tints are present in places, though sometimes the predominant colour may be a pale buff passing into a tawny olive. Spreading edge indefinite, filmy, byssoid to villous, Light Buff (XV.), Pale Pinkish Buff (XXIX.) to Cream Buff (XXX.), sometimes with vinaceous tints which may also appear in the substratum. As the substance increases in thickness, eventually reaching 1 mm., pores develop, first as shallow reticulations (often purplish), producing alveoli varying in size, averaging about 3 in 1 mm., sometimes 5 in 1 mm., the pore surface thus produced pale buff in colour, but in parts Dark Purple Drab and Vinaceous Drab (XLV.) or Perilla Purple (XXXVII.). As the pores develop they increase in depth to reach in places nearly 1 mm., forming most of the substance; the orifices vary in size, about 3 in 1 mm., some 0.5 mm. in diameter, others 0.25 mm. or even 0.16 mm., the dissepiments thin or in places thicker and rounded or sometimes the pores may appear like pinholes widely separated from each other. Eventually the thicker parts of the pore layer may assume a Tawny Olive (XXIX.) tint. Hyphae whitish, septate, thick-walled, irregular, branching at right angles, 3.5 to 5 μ. Shed spores slightly curved, narrow, rod-shaped, cream-coloured to white, 4.2 to 5.5 x 2 μ. South Australia—Humbug Scrub, National Park. New South Wales. Europe. April, May.

381. **Poria vincta** Berk. (L., *vinctus*, bound, girt).—This is a variable species, vinaceous fawn to pinkish cinnamon in colour and 1 to 6 mm. in thickness. Thick specimens from New South Wales and Queensland form extensive patches 10 cm. or more long and up to 4 cm. wide, in colour near Vinaceous Fawn and Avellaneous (XL.) becoming browner, varying in thickness from 1 to 6 mm., the edges irregular but sharply defined with a very narrow paler sterile edge. Substance corky to woody, near Avellaneous. Pore mouths very minute, about 6 in 1 mm., dissepiments rounded. Spores (apparently) subspherical, 2.5 to 5 μ. Hyphae whitish, about 3 μ thick, with much granular material. Thin forms from Tasmania, and Mount Lofty, South Australia, form patches up to 7 x 4 cm., Pinkish Cinnamon, Cinnamon and Clay Colour (XXIX.), or between Light Pinkish Cinnamon and Pinkish Cinnamon but darker, or near Light Ochraceous Buff (XV.), or Light Vinaceous Cinnamon, or paler than to deeper than Light Pinkish Cinnamon becoming when old near Cinnamon (XXIX.) to Cinnamon Rufous (XIV.) or browner than Cinnamon near Sayal Brown (XXIX.), rather indeterminate, with the sterile edge paler and sub-byssoid, occasionally with a reflexed villose border above, forming a narrow pileate shelf, membranaceous, very thin (usually under 0.5 mm., rarely nearly 1 mm. thick), pore orifices minute 0.08 to 0.13 mm., 6½ to 11 in 1 mm., finely setulose, dissepiments thin. May to August, October.

382. **Poria attenuata** Peck. (L., *attenuatus*, made thinner).—Forming irregular patches up to 7 x 3 cm. in the hollows and interstices of a rotting *Pinus* log. The sterile mycelium is extensive, villose, and pallid ochraceous, as the pores develop, first as minute pits, becoming Ochraceous Salmon (XV.), passing as the tubes elongate to near Argus Brown (III.) and when old becoming darker near Burnt Umber (XXVIII.). The fungus is firmly adherent to the substratum. The brown pores eventually form a layer up to 2 mm. thick, resting on the light pale decaying wood without any obvious substratum. The orifices are exceedingly minute, about 6 in 1 mm., slightly variable in size, the dissepiments rounded. Hyphae whitish, irregular, branching irregularly, with transverse connections and much debris, 2 to 4.8 μ. South Australia—Beaumont, near Adelaide. United States of America. June.

III. Receptacle more or less gelatinous.

GLOEOPORUS Montagne.

(Gr., *gloia*, jelly.)

"Receptacle usually small, leathery or viscid-fleshy. Hymenium gelatinous as in *Tremella*. Pores rounded, contracted when dry, when moistened swollen gelatinous."—Killermann.

The only species we have is not small but forms narrow brackets sometimes 6in. or more in lateral extent. It is essentially a *Polyporus* with the hymenium subgelatinous when moist.

383. **Polyporus (Gloeoporus) dichrous** Fr. (Gr., *dis*, twice; *chroa*, colour).—Forming irregular narrow shelves up to 6in. (15 cm.) or more long and ½ to ¾in. (1.2 to 1.8 cm.) from before backwards, sometimes somewhat or much imbricated, often extensively resupinate and extending for several inches on the undersides of fallen decaying logs, soft to the touch, flexible but tough. Upper surface tomentose, becoming rather villous towards the margin, Smoke Grey (XLVI.) or pallid with a greyish to greyish brown tinge, edge whitish. Hymenial surface irregular often from covering the substratum, with a narrow white villous, growing edge, at first white and translucent passing through flesh-colour to Light Pinkish Cinnamon (XXIX.), Cinnamon or Sayal Brown, pore orifices minute, 3 to 4 in 1 mm., regular, becoming pale brownish when injured, dissepiments rounded, tubes rather shallow, appearing semi-translucent on section. Context soft but firm, 1 to 1.5 mm., whitish with a slight buff tint. Spores "cylindrical, often allantoid, smooth, hyaline, 4 to 6 x 1 to 1.5 μ" (Cunningham). On fallen logs and branches. South Australia—Botanic Gardens, National Park, Mount Loftv, Kuitpo. May-August.

This is a common species on fallen logs, especially their undersides, in the National Park at Belair and somewhat resembles *Polystictus versicolor* but forms usually more extensive patches which are softer to the touch and less rigid and present a moister appearance. The non-zoned pallid greyish brown pileus and specially the flesh colourd to greyish-brown or even purplish-brown pore surface are further helps in recognition. In the fresh state, the tube layer is almost gelatinous and is readily separable from the context, features which constitute the genus *Gloeoporus* of some authors (as here). The species does not seem of economic importance beyond helping in the decay of fallen logs and branches.

LASCHIA Montagne.

(After Lasch, one of the older mycologists.)

"Receptacle gelatinose-tremellaceous, when dry membranaceous. Hymenophore on the under side, honeycombed or almost reticulate; pores thin, soft, in substance like the overlying receptacle. Basidia with 4-sterigmata. Spores hyaline."—Killermann.

384. **Laschia fusca** Clel. (L., *fuscus*, very dark brown, fuscous).—Cup-shaped, 3 to 5 mm., 1 mm. thick, attached dorso-laterally. Pileus convex, smooth, edge rounded and slightly in-turned when young, Fuscous Black (XLVI.) (the colour of the blackened fallen stringy-bark Eucalyptus on which it grew), paler round the edge. Hymenial surface concave, Fuscous (XLVI.), tubes 2 to 3 in 1 mm., orifices honeycomb-like and usually a little irregular, dissepiments thin and sometimes defective. Flesh gelatinous-firm. Spores subspherical, 6.5 μ. South Australia—On fallen log, National Park. July.

III. MERULIAE.

Hymenium spread over veins, anastomosing pores or quite smooth; edge of veins or pores fertile.

MERULIUS Fr.

(L., *merus*, pure.)

"Receptacle gelatinous, coriaceous gelatinous, waxy, membranaceous or floccose: resupinate or effuso-reflexed. Hymenium at first smooth, becoming reticulated with irregular, obtuse folds or pores, at length gyrose or obsoletely toothed, and fertile on the edge. Spores white or coloured; elliptical, ovoid, pip-shaped, globose, subglobose, elliptic-oblong, cylindrical or sausage-shaped; smooth. Cystidia present or absent. Growing on wood, rarely on the ground."—Rea.

In Merulius the reticulations or veins anastomose to form irregular shallow pores.

KEY TO THE SPECIES.

Spores brown.

Broadly effused or sometimes resupinate. At first white, very light, soft. Later, hymenial folds reddish brown. On worked wood in houses .. 385. *Merulius lacrymans.*

Spores white.

Resupinate-effused, margin becoming free, whitish. Reticulations flesh-coloured to ochraceous tawny and tawny olive. On undersides of rotting sticks, etc. .. .. 386. *M. corium.*

Effused, shining, white becoming slightly brownish, adherent. Reticulations shallow .. .. 387. *M. candidus.*

385. **Merulius lacrymans** (Wulf.) Fr. (L., *lacrymans*, weeping).—Forming spongy-fleshy sheets of tissue, resupinate or effuso-reflexed, 2 to 4in. (5 to 10 cm.) or more (up to 20in., 50 cm.—Rea) in extent, exuding drops of water when growing, on damp worked wood in buildings, timber yards, etc. A specimen from Lockleys, near Adelaide, July, forms a sheet about 4in. in size, 1 mm. thick, the hymenial surface consisting of obtuse irregular deep reddish brown (near Auburn, II.) folds 1 to 2 mm. thick, the opposite surface somewhat wrinkled and radiately disposed, near Cinnamon Buff (XXIX.), spores elliptical, yellowish brown, 9 x 5 μ.

This is sometimes called the "dry-rot fungus," though it is not by any means the only species capable of causing a fungus rot in worked wood in houses, and moreover, it necessarily requires a certain amount of moisture for its development. Timber which is kept dry cannot be attacked by fungi and it is probably owing to our dry climate that we are relatively immune to losses from this and similar fungi; *M. lacrymans*, for instance, has only been recorded this once for South Australia. Massee describes the whole fungus as being generally broadly effused, soft and tender, at first very light, cottony and white, but when the irregular folds forming the fruiting portion appear, these are yellow-orange or reddish brown in colour. When the brown spores are set free from the surface of these folds, they may be widely distributed and settle and develop on suitable moist timber in other parts of the building or elsewhere. Before this stage is reached, the fungus spreads by contiguity or by the transport of the mycelium in pieces of rotting infected wood. Care must therefore be taken that, in removing the diseased wood, every portion which is infected or is likely to be in an early stage of infection, is taken away and burnt and it is very important that the fungus should be detected and destroyed before the sporing stage has been reached.

386. **Merulius corium** (Pers.) Fr. (Gr., *chorion*, leather).—Forming thin skin-like patches, varying in size according to the substratum from under one inch (2.5 cm.) to several inches long and from $\frac{1}{2}$in. (1.2 cm.) to 1in. (2.5 cm.) wide (3in. x $\frac{3}{4}$in., 6in. x $\frac{1}{2}$in., etc.), usually on the underside of rotting twigs, sticks, bark, and fallen wood, occasionally compacting small twigs, etc., together. The patches are soft when moist, resupinate effused, the margin when old separating from the underlying matrix and becoming free and curled up so that portions can be pulled off like pieces of skin (corium), the fertile surface reticulato-porous, the pores very shallow, first appearing as minute reticulations. The sterile surface extensive, often remaining sterile for long, whitish, the fertile reticulations "flesh colour or pale tan" (Rea), in our plants becoming Ochraceous Tawny (XV.) and darker, near Tawny Olive (XXIX.), etc., when treated with corrosive sublimate—carbolic acid—spirit preservative becoming near Flesh Ochre and Apricot Orange (XIV.). Hyphae 3.5 to 5.5 μ thick. Spores elongated, white, 5.5 to 8.5 x 2.2 to 3.5 μ. South Australia—Beaumont, Mount Loftv, National Park (on fence posts, etc.), Kalangadoo (S.E.). Queensland. New South Wales. Victoria. New Zealand. Europe, etc. April to August.

387. **Merulius candidus** Lloyd. (L., *candidus*, shining white).—Forming irregular rounded or elongated very thin patches up to 16 x 1.5 cm., resembling splashes of whitewash with outlying spots contrasting with the brown of the dead branchlets on which it is growing. Except where the shallow reticulations of the pores appear, the surface is smooth like that of the glaze on some forms of cotton-wool. The edge is fairly sharply determinate. The pellicle separates with difficulty. Pure white with in places a tendency to brownish discoloration, when effete becoming brownish like a faded leaf. Pores very shallow, irregularly polygonal to elongated, 0.5 to 1 mm. wide, the dissepiments vein-like or as low reticulations. Hyphae mostly very fine, rather curly, felted, 1.5 to 2 μ thick, rarely more. New South Wales—Lorne, near Kendall.

[*From watercolour by Miss P. Clarke.*

Figure 53.—*Fistulina hepatica* **(Huds.) Fr. (No. 389). Mount Wilson, New South Wales. Slightly reduced.**

Figure 54.—*Fistulina hepatica* **(Huds.) Fr. (No. 389). Section. Mount Wilson, New South Wales. Slightly reduced.**

The following South Australian specimen may be this species:—Not a pure white, with rusty discoloration at the edges which are more indeterminate, pores deeper and smaller, about 0.25 mm. wide, and dissepiments thinner, spores ? subspherical, 4 μ, hyphae thick-walled, irregular, 2 to 5.5 μ thick.

PHLEBIA Fr.

(Gr., *phleps, phlebos,* a vein.)

"Receptacle waxy or subgelatinous, becoming cartilaginous when dry; erect or resupinate and effused. Hymenium from the first covering radiating, obtuse wrinkles or veins, continuous or broken up into tubercles, rarely smooth, fertile on the edge. Spores white; elliptical, reniform, oblong, or cylindrical; smooth. Cystidia none. Growing on wood, rarely on the ground."—Rea.

388. **Phlebia reflexa** Berk. (L., *reflexus,* bent back).—Effuso-reflexed, the reflexed portion often very narrow, sometimes with rather imbricate pilei, up to 2in. (5 cm.) laterally and $\frac{3}{4}$in. (18 mm.) from before back, concentrically sulcate, zoned, coarsely villose, dark brown to fuscous (near Natal Brown, XL.) becoming bleached greyish brown. Hymenium when moist irregularly wrinkled, rather soft and gelatinous, purplish brown with a whitish bloom or purple chocolate-coloured with an orange tint in places; when dry Fuscous (XLVI.), paler round the edge, growing edge Ochraceous Buff (XV.). Spores sausage-shaped with an oblique apiculus and occasional guttae, white, 7 to 8.5 x 3.5 μ. South Australia—Mount Lofty, National Park, Clare. New South Wales. April, May, July, August.

PLICATURA Peck. (TROGIA Fr. p.p.)

(L., *plicatus,* folded; Gr., *oura,* a tail.)

"Pileus spongy coriaceous, soft, flaccid; dimidiate, sessile or substipitate. Hymenium covering obtuse veins, gill-like in front, crisped and branched behind, fertile on the edge. Spores white; oblong or cylindrical; smooth. Cystidia none. Growing on wood."—Rea.

No species recorded for South Australia.

IV. FISTULINEAE.

Hymenium inferior, lining free and separate tubes.

FISTULINA (Bull.) Fr.

"Pileus fleshy, subgelatinous in the upper layer, stipitate or sessile. Stem lateral or none. Tubes at first papillose, then cylindrical, distinct and free from each other. Spores coloured, elliptical, smooth. Conidia present in the tissues. Growing on wood."—Rea.

389. **Fistulina hepatica** (Huds.) Fr. (Gr., *hepatikos,* belonging to the liver).—"Pileus 2 to 12in. (5 to 30 cm.), roundish, dimidiate or subspathulate, sessile or stipitate, rough, thick, fleshy, viscid, blood red, pale purplish red, liver-coloured, or chocolate becoming blackish. Stem when present $1\frac{1}{4}$ to $2\frac{3}{4}$in. (3 to 7 cm.), x $\frac{4}{5}$ to $1\frac{3}{5}$in. (2 to 4 cm.), punctate, concolourous. Tubes pallid, becoming reddish, separate; orifices of tubes pale, round. Flesh reddish, marbled like beet root, fibrous, distilling a red pellucid juice, $\frac{4}{5}$ to $1\frac{1}{5}$in. (2 to 3 cm.) thick. Spores pink, subglobose, 4.5 to 5 x 4 μ, with a large central gutta. Taste somewhat acrid, especially when young. Edible. On trunks of trees."—Rea. South Australia—Specimens collected at Mount Lofty on dead stumps and at the base of Eucalypts were rather flabelliform in shape, 3in. (7.5 cm.) deep and wide, villous, dark brown (near Rood's Brown, XXVIII.), pore orifices near Japan Rose (XXVIII.), the tubes separate, coral pinky-brown, then brownish-pink; flesh with brown and paler layers; spores, whitish, 4.8 x 3.2 μ. New South Wales. Victoria. Europe, etc. May, June. (Figures 53 and 54.)

HYDNACEAE.

"Hymenium spread over the surface of spines, granules, warts or other protuberances, or of quite a smooth surface, with the intervening spaces sterile. Receptacle fleshy, coriaceous, waxy, crustaceous or floccose, rarely none."—Rea.

In the Hydnaceae, the hymenium or spore-bearing surface is spread over spines, warts or granules. In the higher forms, the spines are long and awl-like, in other genera they may be flattened, plate-like, nodular or so small as to require a lens to recognise them. The plants may be fleshy, cork-like, waxy or crust-like. There may be a well-developed central or lateral stem and cap, or the attachment of the fungus may be lateral and broad, or the whole plant may be effused over the stratum on which it has grown.

MUCRONELLA Fr.

(L., *mucronella*, a little sharp point.)

"Receptacle none, consisting of a floccose, fugacious mycelium. Spines simple, cylindrical, subulate, acute, scattered or fasciculate, and then more or less connate at the base. Spores white, oblong or subglobose, smooth or punctate: basidia with 1-4 sterigmata. Cystidia present, Growing on wood."—Rea.

No Australian species recorded.

HYDNUM (L.) Fr.

(Gr., *hydnon*, the old name for a truffle.)

"Receptacle fleshy, coriaceous or corky, simple or branched, pileate or coralloid, stipitate or sessile. Stem central, lateral or none. Spines subulate, acute, distinct at the base. Flesh white or coloured. Spores white or coloured; elliptical, oval, globose, subglobose or angularly globose; smooth, granular, verruccose or echinulate; basidia with 2-5 sterigmata. Cystidia present or absent. Micro- and macro-conidia present in some species. Growing on the ground or on wood."—Rea.

KEY TO THE SPECIES.

Fleshy. Light ochraceous buff, spines slightly decurrent, stem central or eccentric .. .. 390. *Hydnum repandum.*

Rigid, coriaceous. Often confluent.

Smoky brown. Spines grey. Strong smell .. .. 391. *H. graveolens.*

Ferruginous brown. Spines dark ferruginous brown. No strong smell .. .. 392. *H. zonatum.*

390. **Hydnum repandum** (L.) Fr. (L., *repandus*, bent backwards).—Pileus ¾ to 1½in. (1.8 to 3.7 cm., in British specimens 5 to 15 cm.), nearly plane or slightly depressed or slightly convex, usually irregular, surface dull, edge turned in when young, fleshy, pallid with a buffy tint becoming Light Ochraceous Buff (XV.). Spines adnate with a decurrent tendency, ⅛ to nearly ½in. (3.5 to 10 mm.) long, crowded, unequal, entire, subulate to conical or blunt, buffy cream becoming Light Ochraceous Buff (XV.). Stem 1¼ to 2in. (3.2 to 5 cm.), moderately slender (up to ½in., 1.2 cm., thick), central or sometimes excentric or nearly lateral, equal or slightly attenuated upwards, solid, white or whitish, with ochraceous buff stains appearing, Flesh brittle, whitish becoming near Ochraceous Orange (XV.). Taste none. Spores subspherical to irregular, whitish, 5.6 μ. Single or subcaespitose, on the ground. South Australia—Mount Lofty. New South Wales. April. June. (Figure 55.)

This edible species is not common with us. It may be recognised by its fleshy texture, light ochraceous buff colour, an excentric or central stem, and the more or less decurrent spines on the under-side of the often irregular pileus.

391. **Hydnum graveolens** (Delast.) Fr. (L., *graveolens*, strong smelling).—Caespitose with slender stems and pilei which may become united at their edges. Pilei ⅓ to 1in. (9 to 2.5 cm.), more or less umbilicate to nearly infundibuliform, often irregular, radiately striate, rigid, brittle, rather shining, smoky brown. Spines crowded, subulate, about 1.2 mm. long, glaucous to dark grey. Stems 1in. (2.5 cm.), slender (1 to 2 mm. diameter) or sometimes flattened to 5 mm.,

rugose, rather irregular, not definitely enlarged at the apex, sometimes confluent, earthy brown. Flesh thin, concolorous. Spores subspherical, faintly rough or irregular, slightly tinted, 4.5 to 5 μ. Smell strong and pungent like curry powder. On the ground amongst leaves, etc. South Australia—Mount Lofty. June, July.

392. **Hydnum zonatum** (Batsch.) Fr. (L., *zonatus*, zoned).—Pilei tending to grow together, very irregular, stems often broadly flattened and more or less united. Confluent pilei up to 3 x 2in. (7.5 x 5 cm.), often compressed and distorted when under logs or with adherent leaves, sometimes gibbous, sometimes depressed in the centre with radiating knife-like ridges, radiately rugose, edge irregular and often lacerated, ferruginous brown. Spines more or less decurrent on the stem, crowded, at first as minute separate points, finally 1 to 2 mm. long, slender, subulate, dark ferruginous brown. Stems up to 1¼in. (3.1 cm.), when simple 2 mm. wide, when flattened up to 1 cm. wide, more or less central, coarsely rugose, swollen at the base, dark ferruginous brown. Flesh dark brown. Spores rough, warty, slightly tinted, 4 μ. On the ground under *Xanthorrhoea*, attached to the underside of a fallen trunk, etc. South Australia—Mount Lofty, Greenhill Road. New South Wales—North Bridge. June, July, August.

[*From watercolour by Miss P. Clarke.*

Figure 55.—*Hydnum repandum* **(L.) Fr. (No. 390). New South Wales.**

MYCOLEPTODON Pat.

(Gr., *mykēs*, fungus; *leptos*, thin; *odōn*, a tooth.)

"Receptacle membranaceous-coriaceous, thin, firm, resupinate or reflexed. Spines simple, firm, cylindrical, pointed, hispid at the apex; none or reduced in size at the margin. Spores white, ovoid, oboval, subelliptical or oblong, smooth; basidia with 2-4 sterigmata. Cystidia present, abundant at the apex of the spines. Growing on wood, more rarely on humus."—Rea.

No South Australian species recorded.

ACIA Karst.

(Gr., *akē*, a point.)

"Receptacle resupinate, thin, waxy. Spines slender, subulate, generally entire, distinct or connate at the base. Spores hyaline. Cystidia none. Cystidioles (more or less hair-like bodies, possibly sterile basidia) sometimes present, usually small and thin-walled."—E. M. Wakefield.

KEY TO THE RESUPINATE SPECIES OF *HYDNACEAE*.

Hymenium spread over subulate spines.

Deep chrome, yellow ochre or raw sienna when fresh.

Spines simple or flattened, sometimes divided. Spores 5 to 6 x 2.5 μ .. .. 393. *Acia subceracea.*

Pale tawny olive, then snuff brown.

Spines becoming umber, to 0.5 mm., fasciculate .. .. 394. *A. subfascicularia.*

Hymenium spread over tubercles or obtuse spines.

Warm buff, with closely set granules .. .. .. 395. *Grandinia Clelandii.*

Deep chamois, then between raw sienna and buckthorn brown, with crowded granules .. .. .. 396. *G. australis.*

White becoming cream-coloured, sometimes with subulate spines, sometimes granules. Spores rough, 3 to 4.5 x 2.5 to 4 μ .. .. 397. *G. farinacea.*

[Dark grey to light drab, beset with very minute granules composed of fascicles of hyphae .. .. 411. *Epithele glauca.*]

Hymenium spread over conical spines, ciliate or penicillate at the apices.

Cream to deep ochraceous .. .. 398. *Odontia arguta.*

Yellow ochre becoming cinnamon buff or olive buff to avellaneous or wood brown. Cystidia numerous .. .. 399. *O. Archeri.*

393. **Acia subceracea** Wakef. (L., *subceraceus*, somewhat waxy).—"Effused, closely adnate, subwaxy, tan-coloured, with indeterminate margin. Spines scattered or close together, subulate, waxy, fulvescent or chestnut-coloured, with paler apices. Subiculum tan-coloured, thin, waxy-membranaceous. Basidia cylindrical-clavate, with four sterigmata, 12 to 20 x 4 to 5 μ. Spores elliptical, with one border depressed, hyaline, 5 to 6 x 2.5 μ. Cystidioles scattered, sometimes very few, hyaline, subulate, 45 to 60 x 3 to 5 μ, projecting 40 μ. Basal hyphae densely interwoven, hyaline, not nodose, 2 to 3.5, sometimes 4 μ, thick. On rotten wood."—Wakefield. South Australia—Mount Lofty, National Park. May, June.

Forming thin, adherent, irregular, ill-defined or fairly well-defined patches 2½ to 6 x ¼ to ½in. (6.2 to 15 x 0.6 to 1.2 cm.) in extent, Deep Chrome (III.) or near Yellow Ochre (XV.) and Raw Sienna (III.) when fresh, when dry near Yellow Ochre (XV.) but dingier and darker in places, sterile edge sometimes greyish with a white fluffy border. Subiculum very thin, somewhat floccose, paler than the spines, near Pinkish Buff (XXIX.). Spines irregularly grouped, close or widely separated, free or sometimes connate, sometimes acute or with rounded apices, often flattened like an incisor tooth, simple or subdivided, sometimes when flattened with 3 or 4 prongs, up to 1 to 1.5 mm. high, when dry dingy ochraceous-buff; sometimes with the subiculum the spines split into groups.

394. **Acia subfascicularia** Wakef. (L., resembling the species *A. fascicularia* B. et C.)—"Effused, thin, closely adnate, waxy, pale tawny olive, finally snuff brown. Spines at first minute, fulvous-ochraceous, then larger to 0.5 mm., fasciculate, umber, with paler apices. Basidia clavate, 20 to 24 x 3 to 4 μ with 4 sterigmata. Spores hyaline, elliptical, with one border depressed, bi-guttulate, 4 to 5.5 x 2 to 2.5 μ. Hyphae loosely inter-twined, subhymenial ones thinly coated to 2 to 3 μ, basal ones thickly coated to 6.5 μ in diameter. Hyphae in the spines erect, adhering, often coated with crystals, 2 μ in diameter. On bark."—Wakefield. South Australia—Mount Lofty. May.

HYDNOCHAETE Bresadola.

(Gr., *hydnon*, an old name for a truffle; *chaitē*, long flowing hair.)

"Receptacle resupinate, effused, corky-leathery. Hymenophore with awl-like dark brown bristles. Basidia 4-spored; spores colourless."—Killermann.

No South Australian species recorded.

ASTERODON Patouillard.

(Gr., *aster*, a star; *odous, odontos*, a tooth.)

"Receptacle resupinate, effused, membranous flaky. Hymenophore with star-shaped or branched brown cystidia; hymenium covered with awl-like spines. Basidia 4-spored; spores longish, almost colourless."—Killermann.

No South Australian species recorded.

RADULUM Fr.

(L., *radula*, a rasp.)

"Receptacle resupinate, effused, waxy or membranaceous waxy. Tubercles or spines thick, deformed, obtuse, simple or branched, irregularly scattered or confluent and tooth-like. Spores white or coloured, elliptical, subglobose or cylindric oblong, smooth. Cystidia none, cystidioles (sterile basidia) sometimes present. Growing on wood."—Rea.

No South Australian species recorded.

GRANDINIA Fr.

(L., *grando*, hail.)

"Receptacle resupinate, thin; membranaceous, pellieulose or crustaceous. Tubercles or spines obtuse or occasionally pointed, entire. Spores hyaline or faintly yellowish. Cystidia absent. Cystidioles rarely present and but little differentiated."—E. M. Wakefield.

395. **Grandinia Clelandii** Wakef. (Named after the finder, J. B. Cleland).—"Effused, thin, closely adnate, tomentose-membranaceous, tan-coloured, with closely-set irregular concolorous granules, edge indeterminate, pulverulent. Basidia clavate or urn-shaped, 40 to 50 x 8 to 9 μ, sterigmata 4, 6 μ long. Spores elliptical, hyaline, 10 to 11 x 8 μ. Hyphae hyaline, loosely interwoven, septate-nodose, 2.5 to 4 μ in diameter, with erect branches often with the apices vesiculosely inflated. On bark."—Wakefield. New South Wales.

"This is a very distinct species. The colour is uniformly warm buff, and the texture somewhat loose, giving the plant a pulverulent or tomentose appearance when viewed with a lens. In section the most marked character is the abundant vesicular bodies in which some of the upward-growing hyphae terminate. These recall the vesicles of *Stereum purpureum*, and like those occur only in the subhymenial tissue. Both basidia and spores are large for the genus."—Wakefield.

396. **Grandinia australis** Berk. (Syn., *Hydnum pexatum* Mass.) (L., *australis*, here for Australian).—"Irregularly effused, closely adnate, membranaceous, at first alutaceous (deep chamois) with scattered granules, finally becoming between raw sienna and buckthorn brown, very uniform in colour, with crowded granules. The yellowish pigment is soluble in a solution of potassium hydrate with the production of a rich vinaceous tint. Margin indeterminate, narrowly byssoid at first, yellowish or concolorous. Hymenium cracked when dry. Basidia clavate or urniform, 25 x 5 μ, with 4 sterigmata 2 to 5 μ long. Spores broadly elliptical, one side slightly depressed, 6 to 7 (to 9) x 4 to 5 μ. Cystidioles present, but scattered, sometimes fusiform and pointed, at other times scarcely differing from young basidia, projecting little from the surface of the hymenium, about 30 to 35 x 8 μ. Basal hyphae branched, septate, with clamp-connections, 3.5 to 4 μ in diameter. On bark."—Wakefield. New South Wales. Victoria—On *Eucalyptus obliqua* L'Herit., Gippsland. Tasmania. March.

"This species resembles *Odontia Archeri* in the vinaceous colour which is produced when sections are treated with potash, but differs from that species in its more uniform colour and the absence of vivid yellow tints in the subiculum, and microscopically in the shape of the spores and the absence of embedded encrusted cystidia."—Wakefield.

397. **Grandinia farinacea** (Pers.) Bourd. et Galz. (L., *farinaceus*, mealy).—"Effused, thin, floccose or softly membranaceous, at first pure white, finally cream-coloured, margin byssoid or indeterminate. Spines sometimes subulate, sometimes reduced to granules, very soft and fragile, with projecting sterile hyphae at the apex. Basidia 6 to 12 to 21 x 3 to 5 μ with 2 to 4 sterigmata

3 to 4.5 μ long. Spores subglobose or ovate, finely asperulate, 3 to 4.5 x 2.5 to 4 μ. Hyphae thin-walled, with clamp-connections, 1.5 to 4 μ in diameter, sometimes swollen to 7 μ at the septa. On rotten wood and bark.''—Wakefield. South Australia—Kuitpo, near Adelaide. August, September.

''Easily recognised by the rough spores. A very common European species.''—Wakefield.

Grandinia glauca Cke. is not a *Grandinia* but belongs to the Thelephoraceous genus *Epithele* (see No. 411).

ODONTIA Fr.

(Gr., *odous*, a tooth.)

''Receptacle resupinate, thin, membranaceous; waxy, crustaceous or mealy. Spines conical, ciliate or penicillate at the apex. Spores hyaline. Cystidia present.''—E. M. Wakefield.

398. **Odontia arguta** (Fr.) Quél. (L., *argutus*, sharp).—''Effused, thin, membranaceous, dry, margin indeterminate, tomentose, whitish. Hymenium cream to deep ochraceous, with granuliform or subulate spines usually more or less penicillate at the apex. Basidia clavate, 20-30 x 5 μ, with 4 sterigmata, accompanied by small cystidia or cystidioles of varying form, sometimes rounded above and excreting a globule of resinous matter, sometimes subulate and strongly encrusted at the apex. Spores ovate, often one-guttulate, 5-5.5 (-6) x 4 μ. Hyphae hyaline, with clamp-connections, 2-3 μ in diameter. On bark and dead wood.''—Wakefield. New South Wales—Pilliga Scrub. Tasmania—Brown's River, National Park. New Zealand. January, October.

399. **Odontia Archeri** (Berk.) Wakef. (Syn., *Corticium Archeri* Berk.; *Kneiffia Wrightii* B. et C.; *K. chromoplumbea* B. et Br.; *Corticium chrysocreas* B. et C.; *Odontia Wrightii* (B. et C.) Burt.) (After William Archer, 1820-1874, a noted Tasmanian botanical collector).—''Broadly effused, firm, fairly thick, but not waxy, closely adnate, at first thin, even or more or less papillate, later with distinct spines, becoming much thicker and when dry often cracked into small areolae. Hymenium variable in colour, yellow ochre when young and actively growing, but becoming cinnamon-buff or olive-buff then avellaneous or wood brown with age. Margin indeterminate, at first buff-yellow or Empire yellow, later concolorous with the hymenium. Subiculum similarly bright yellow at first, but in old specimens the tissue exposed in the cracks often appears white, probably on account of the abundant excretion of crystals from the tissues. The structure in section is very characteristic, but can only be observed well in young specimens. Numerous cystidia are present, both embedded in the tissues and projecting slightly from the hymenium. These are small, shortly fusiform, thin-walled and hyaline at first, 18-20 x 6-8 μ. Later the embedded cystidia become strongly encrusted with a deep yellow, apparently resinous excretion, which is soluble in a solution of potassium hydrate with the production of a vinaceous tint. It is insoluble in lactic acid and the structure is best observed in sections mounted in this medium. The encrusted cystidia eventually occupy considerable space in the subhymenial tissues, and appear to be vesicular bodies, as described by Burt for *Corticium chrysocreas*. Basidia 15-20 x 4.5 μ, with 4 sterigmata, 3 μ long. Spores hyaline, elliptical, one side depressed, sometimes 2-guttulate 4.5-5 (-6) x 2-2.5 μ. Basal tissue at first somewhat compact, later the hyphae appear to be loosely interwoven, hyaline, thin-walled, 3-4 (-5) μ in diameter. The tissue in older specimens contains much mineral matter in the form of crystals, often forming masses in the central tissue of the spines. On bark.''—Wakefield. South Australia—Mount Lofty. New South Wales—Mosman. Tasmania—Brown's River. Ceylon. Cuba. United States of America. January, May, June.

HYDNOPSIS (Schroet.) Rea.

(Gr., *hydnon*, the genus *Hydnum*; *opsis*, like.)

''Receptacle floccose, resupinate, effused. Spines subulate, acute. Spores coloured, elliptical, smooth. Growing on dead leaves and on the ground.''—Rea.

No South Australian species recorded.

CALDESIELLA Sacc.

(After L. Caldesi, an Italian botanist.)

"Receptacle floccose, soft, resupinate. Spines conical, soft, villose, fimbriate at the apex. Spores coloured, globose, verrucose or echinulate; basidia clavate with 2-4 sterigmata. Growing on wood."—Rea.

No South Australian species recorded.

KNEIFFIA Fr.

(After Friedrich Gotthard Kneiff, a German mycologist.)

"Receptacle gelatinous, effused. Spines or granules scattered, minute, sterile. Spores white, elliptical, smooth. Growing on wood."—Rea.

No South Australian species recorded.

GRAMMOTHELE Berk. et Curtis.

(Gr., *grammē*, a stroke in writing, a line; *thēlē*, a nipple.)

"Receptacle crustaceous spread out over the substratum, with pore-like retiform furrowed hymenophore, beset with rough granules and warts covered by the hymenium."—Killermann.

No South Australian species recorded.

GLOIOTHELE Bresadola.

(Gr., *gloia*, jelly; *thēlē*, a nipple.)

"Like *Grammothele* but with gloeocystidia."—Killermann.

No South Australian species recorded.

LOPHARIA Kalchbrenner.

(Gr., *lophos*, a crest.)

"Receptacle papery-membranaceous, sterile, with raised, interrupted, crested, incised wrinkles, covered with the hymenium. Cystidia present."—Killermann.

ALDRIGEA Massee.

(After Miss Emily Aldridge.)

"Receptacle subgelatinous, becoming cartilaginous when dry, resupinate, effused. Hymenium smooth, even. Spores coloured, elliptical, smooth; basidia with 4 sterigmata. Growing on wood."—Rea.

No South Australian species recorded.

PTYCHOGASTER Corda.

(Gr., *ptyx*, a fold; *gastēr*, the belly.)

"Receptacle fleshy or somewhat corky, round or cushion-shaped, producing conidia and chlamydospores. Cystidia present or absent. Growing on wood or encrusting plants."—Rea.

No South Australian species recorded.

THELEPHORACEAE.

"Hymenium spread over a smooth, rugose or ribbed surface, either resting upon an intermediate layer of hyphae running longitudinally between it and the mycelium, or seated directly upon the mycelium."—Rea.

In the Thelephoraceae, the fruiting surface is more or less smooth. In *Stereum* we have one stalked species, and several common reflexed bracket-like ones, amongst which *S. purpureum* is a destructive parasite on the branches of fruit-trees producing "Silver Leaf Disease." *Thelephora terrestris* is common under pines, forming masses composed of compressed, often overlapping, more or less confluent pilei, often with entangled pine needles. The species of *Corticium* are effused, mostly thin, plants, sometimes like patches of paint. We have a number of unidentified species, so that this and allied genera are considerably richer than the number described would suggest.

1. **Hymenium separated from the mycelium by an intermediate layer of hyphae.**

SPARASSIS Fr.

(Gr., *sparasso,* I tear in pieces.)

"Receptacle erect, much branched, branches flattened in a lamellar or plate-like manner, fleshy. Hymenium smooth. Spores white."—Rea.

No species yet recorded for the State.

STEREUM (Pers.) Massee.

(Gr., *stereon,* firm.)

"Receptacle coriaceous, pileate, stipitate or sessile, infundibuliform, dimidiate, resupinate or effuso-reflexed. Stem central, lateral or none. Hymenium inferior, with an intermediate layer, smooth, rarely rugulose or ribbed, sometimes setulose, pubescent or velvety. Flesh pale. Spores white, oval, elliptical, globose, subglobose, cylindrical, oblong or oblong elliptic; smooth or granular; basidia with 2-4 sterigmata. Cystidia hyaline, rarely coloured, present or absent. Annual or perennial. Growing on wood or on the ground."—Rea.

KEY TO THE SPECIES.

Stipitate.

Caespitose to confluent at the bases of trees. Pileus irregularly infundibuliform, cinnamon, to 1in. broad. Hymenium pinkish buff to vinaceous fawn .. .. 400. *Stereum elegans.*

Effuso-reflexed.

Hymenium warm buff,

Pileus strigosely hairy, subzoned, ochraceous-tawny, buff to cinnamon brown .. .. .. 401. *S. hirsutum.*

Hymenium greyish or dingy pinkish buff.

Pileus strigosely hairy, subzoned, not deeply lacerated, often narrowed to the attachment, pale wood colour to pinkish buff and sayal-brown .. .. 402. *S. vellereum.*

Similar but pileus deeply lacerated into small blunt lobes. Branched paraphyses present.. 403. *S. radiato-fissum.*

Hymenium vinaceous drab, sorghum brown or Verona brown, with a glaucous bloom, growing edge fawn or vinaceous fawn.

Pileus pilose-strigose, subzoned, usually rich brown (Vandyke brown, etc.) .. .. 404. *S. illudens.*

Hymenium mouse-grey to dark mouse-grey, sometimes pinkish buff.

Pileus villose to strigose, snuff brown to bister .. .. 405. *S. semilugens.*

Hymenium lilac or purplish.

Usually effuso-reflexed. Pileus pallid or greyish, villosely tomentose. Subhymenial cystidia vesiculose .. .. 406. *S. purpureum.*

Usually entirely resupinate. Vinaceous lilac to vinaceous purple, becoming brownish drab to snuff brown. Subhymenial cystidia projecting, acuminate, rough, coloured .. 407. *S. umbrinum.*

400. **Stereum elegans** Meyer. (L., *elegans*, elegant).—Sometimes single or nearly so, usually densely caespitose, confluent and imbricate and often forming extensive rosette-shaped masses, 1 to 1¾in. (2.5 to 4.3 cm.) high. The slender stems expand gradually as they pass into the pilei, tending to fuse when close together. The pilei, up to 1in. (2.5 cm.) or more broad, frequently unite with neighbours by their edges and secondary smaller pilei may arise in the more or less funnel-shaped depressions thus forming. Pilei irregularly infundibuliform with thin margins, glabrous, the edges frayed or irregularly lobed, usually Cinnamon, Pinkish Cinnamon, Cinnamon Buff, Cinnamon Rufous (XIV.), sometimes Tawny (XV.) with deeper coloured zones near Mars Brown (XV.). Hymenium somewhat rugose, Pinkish Buff to Cinnamon Buff (XXIX.) or Vinaceous Fawn (XL.), sometimes presenting a glaucous bloom. Spores subspherical, smooth, hyaline, 5 to 6 x 3.5 to 4 μ. On the ground at the bases of Eucalypt trunks or near fallen wood. South Australia—National Park, Mount Lofty. Victoria. New South Wales. Queensland. May to July.

401. **Stereum hirsutum** (Willd.) Fr. (L., *hirsutus*, hairy).—Reflexed, sometimes more or less resupinate, often forming imbricate masses several inches in vertical or horizontal extent, up to 1in. (2.5 cm.) from before backwards, irregularly convex, wavy and folded, strigosely hairy, margin somewhat wavy and obtuse, subzoned, Ochraceous Tawny (XV.) becoming pallid, near Cinnamon Brown (XV.), Antique Brown (III.), Warm Buff (XV.) or Cinnamon Buff (XXIX.). Hymenium somewhat irregularly concave, smooth or slightly rugose, Warm Buff (XV.) or deeper. Flesh coriaceous, firm, tough. Spores elliptical, incurved, hyaline, 6 to 8 x 3 to 4 μ. No cystidia. Common on stumps and logs. South Australia—Mount Lofty, National Park, Warren Reservoir, Kuitpo. May to August, October.

402. **Stereum vellereum** Berk. (L., *vellus, velleris*, a fleece of wool).—Reflexed or effuso-reflexed, often forming imbricate masses several inches in extent, broadly attached or often in our South Australian plants fan-shaped with a contracted base, usually about ½in. (1.2 cm.) from before backwards, strigosely hairy, subzoned, pale wood-colour or greyish pallid (near Pinkish Buff, XXIX., Tawny Olive, XXIX., becoming dark greyish brown near the attachment). Hymenium even, smooth, greyish buff (near Avellaneous, XL., Pinkish Buff, XXIX., or Tawny Olive, XXIX., to Sayal Brown, XXIX.). Spores 5.5 to 6 x 2 μ. Hyphae thick-walled, 4 to 7 μ. On stem of Eucalypts, fallen branches, etc. South Australia—Mount Lofty, National Park, Stirling West, Kuitpo, Encounter Bay, Warren Reservoir, Clare (on dying branches of Eucalypts, perhaps killing these), Port Lincoln. January, May to August, October. (Figure 56.)

403. **Stereum radiato-fissum** Berk. et Br. (L., *radiatus*, here radiating; *fissus*, cleft).—Specimens, identified by Dr. C. G. Lloyd as this species and coming from the same locality (Mount Lofty) and habitat as specimens identified by him as *S. vellereum*, seem only distinguished from the latter by being fissured into multiple blunt lobes (as in his figure 119, Mycological Notes, No. 52, Dec., 1917, p. 746, in which the fissures extend deeply). The surface is rather coarsely hirsute and subzoned, the hymenium of the same colour as in *S. vellereum*. Lloyd found, however, in these specimens branched paraphyses (dendrophysen). South Australia—On trunks of the stringy-bark (*Eucalyptus Baxteri* (Benth.) Maid. et Blak.), Mount Lofty (spores 6 to 7 x 2.5 to 3 μ).

404. **Stereum illudens** Berk. (L., *illudens*, mocking).—Effuso-reflexed, up to 4in. (10 cm.) or more laterally, ⅜ to ¾in. (10 to 19 mm.) deep, piloso-strigose, especially at the edge, pileus more or less contracted to its attachment which is sometimes quite narrow, somewhat zoned, brownish near Bister (XXIX.), paler or darker than Vandyke Brown (XXVIII.), near Verona Brown (XXIX.). Hymenium smooth, or a little irregular, glaucous (light mouse grey), beneath the bloom Vinaceous Drab (XLVI.), Brownish Drab (XLVI.), near Sorghum

Brown (XXIX.), Ecru Drab (XLVI.) or Verona Brown. Colourless, rough paraphyses (?) sometimes present, 20.5 to 30 x 3.5 μ occasionally 59 (?) x 6 μ. Spores 9 x 3.7 μ. Hyphae pallid, about 4 μ in diameter. South Australia—Clare, Kinchina, Warren Reservoir, Mount Lofty, National Park, Kuitpo, Encounter Bay, Myponga, Ravine de Casoars (K.I.), Cygnet River (K.I.), Caroline State Forest near Mount Gambier. March, May, June, July, August, October.

405. **Stereum semilugens** Kalchb. (L., *semi*, half; *lugeo*, to mourn).—Effuso-reflexed or nearly effused. Up to 2in. (5 cm.) laterally and 1in. (2.5 cm.) from before backwards, villose to strigose, concentrically zoned, more or less plicate, Snuff Brown (XXIX.) to Bister (XXIX.), weathering greyish. Hymenium some-

[*Photo. by S. Tee and W.P.C.*

Figure 56.—*Stereum vellereum* **Berk. (No. 402). Adelaide Hills. Slightly reduced.**

what folded to correspond with the plications of the upper surface, Mouse Gray to Dark Mouse Gray (LI.), the paler part sometimes passing towards Pinkish Buff (XXIX.). Basidia tetrasporous, spores slightly curved, sausage-shaped, 12 to 14 x 4.2 μ (Mount Wilson). South Australia—Ravine de Casoars (Kangaroo Island). New South Wales—Mount Wilson. March, June.

406. **Stereum purpureum** (Pers.) Fr. (L., *purpureus*, purple).—"Pileus $\frac{3}{4}$ to $3\frac{1}{2}$in. (2 to 8 cm.), effuso-reflexed, more or less imbricate, sometimes entirely resupinate, zoned, villosely tomentose, whitish, pallid or greyish; margin entire, sometimes crisped or lobed. Hymenium even, smooth, lilac or purplish. Flesh coriaceous-soft, somewhat thick, whitish. Spores oblong or oboval, apiculate at one end, white, 6 to 8 x 3 to 4 μ. Hymenial cystidia none, subhymenial cystidia vesiculose, 15 to 30 x 12 to 25 μ."—Rea. South Australia—On branches of plum,

apricot, apple and probably cherry trees, causing the destructive disease "Silver Leaf," Clarendon, Forest Range, Bridgewater and Carey's Gully. New Zealand. Europe, etc. (Figure 57.)

Figure 57.—*Stereum purpureum* **(Pers.) Fr. (No. 406). On apple-tree, Carey's Gully, Mount Lofty Range.**

[*By permission from "The Journal of the Department of Agriculture of South Australia,"* XXXIV., 1930-1931.]

The fruiting fungus can be recognised by forming thin patches with a narrow reflexed upper edge, an inch to more than four inches laterally, often more or less overlapping, the upper surface hairy, the hymenium smooth and lilac or purplish becoming faded.

The occurrence in South Australia of Silver Leaf disease, with fructifications of the fungus, was first established by Mr. G. Samuel, then of the Waite Institute, about 1927. Later Mr. S. D. Garrett and Mr. E. Leishman found that the disease had obtained an extensive hold and the latter published their results in "The Journal of the Department of Agriculture of South Australia," XXXIV., 1930-1931, page 1016. The fungus is a wound parasite, the spore lodging on areas that have recently been injured as by pruning, by the breaking of branches or by bruising. The resulting mycelium then penetrates along the vessels of the branch, extending in this way more readily vertically than laterally. In older wounds, a gum barrier prevents such extension and the invasion consequently remains localised or is overcome. Varieties of fruit trees that gum readily are for this reason more resistant to attack, and in these natural recovery may occur. In the more susceptible kinds, Mr. Leishman estimates that the tree is probably killed in from three to six years. The foliage borne on an infected branch is apt to become silvery early in the attack before the branch dies, owing to some toxic substance which is secreted by the mycelium, is transferred to the leaves and there causes partial separation of the cells in the leaf. The resulting abnormal air spaces reflect the light in such a way as to cause the silvery appearance. Such silvering of the foliage in various plants, due to this histological change, may be produced by other causes, so that it is necessary to find the fruiting stage of the fungus before a "Silver Leaf" disease can be certainly attributed to *S. purpureum*.

All branches showing Silver Leaf should be cut off well below the point of entrance of the fungus and it should be seen that this is beyond the discoloration of the wood indicating penetration thus far by the mycelium. Such infected wood should be at once burnt to prevent the formation of fruiting bodies. When the fungus forms its series of little brackets on old infected branches, these discharge millions of spores during the period when rain is falling. Pruning operations at this time are fraught with danger, if through neglect any sporophores of the fungus are in the neighbourhood. Dr. F. T. Brooks recommends covering the wounds with soft grafting wax or an antiseptic paste of the following formula:—To 2lbs. of white lead paste (as bought) add two teaspoonfuls of paste driers and two tablespoonfuls of linseed oil. Mix. Then add 2 tablespoonfuls of turpentine and mix well. The better the nutrition of the tree, the more resistant is it likely to be to attack.

407. **Stereum umbrinum** Berk. et Curt. (Syns., *Hymenochaete crassa* (Lev.) Berk., Cooke's Handbook of Australian Fungi, No. 1044; *H. purpurea* Cke. et Morgan, Cooke No. 1046; *H. Kalchbrenneri* Massee, Cooke No. 1048; *Corticium murinum* Thum.; *Stereum membranaceum* Berk. et Curt. as determined by C. G. Lloyd; and probably *S. papyrinum* Mont. as concerns *Peniophora papyrina* Mont., in Cooke No. 1049, p. 11, figure 82). (*Umbrinus*, umber).—Effused with occasionally a slightly reflexed margin which may be less than ⅛in. (4 mm.) deep, often forming extensive patches up to 6in. (15 cm.) long, tending to crack into small areas. Pileus when present pilose, pallid. Hymenium Snuff Brown (XXIX.) to Bister (XXIX.), Avellaneous to Wood Brown and Army Brown (XL.), paler round the edges with tints of Vinaceous Purple and Vinaceous Lilac (XLIV.), in the fresh plant often forming extensive areas of the periphery, periphery sometimes Tawny Olive (XXIX.). Cystidia elongated acuminate or slightly fusiform, slightly rough, brownish or vinaceous purple, 38 to 110 x 4 to 8.5 μ, occasionally 190 to 300 x 5.7 μ. Spores slightly curved, 7.5 to 8.5 x 3.5 μ. South Australia—Mount Lofty, Stirling West, Kuitpo, Encounter Bay, Kalangadoo (S.E.). March, May to July.

LLOYDELLA Bres.

(After Dr. C. G. Lloyd, the American mycologist who assisted very materially in the study of the higher forms of Australian fungi.)

Like *Stereum* but with hyaline cystidia. Here included under *Stereum*. See *Stereum radiato-fissum*, *S. illudens*, and *S. umbrinum*.

HYMENOCHAETE Lev.

(Gr., *hymēnē*, a membrane; *chaitē*, long flowing hair.)

"Receptacle coriaceous, firm, sessile, effuso-reflexed or resupinate. Hymenium inferior, with an intermediate layer, setulose or velvety, even, rarely granular. Spores white or coloured, elliptical, oval, subglobose, oblong, fusoid or cylindrical ellipsoid; smooth. Cystidia or setae present, coloured. Perennial. Growing on wood."—Rea.

408. **Hymenochaete villosum** Lev. (L., *villosus*, hairy) (Syn., according to Dr. C. G. Lloyd, *H. phaea* Berk., *H. strigosa* B. et Br., *H. spadicea* B. et Br., *Stereum adustum* Lev. (weathered), and *S. nigricans* Lev.). Attached along one edge, effuso-reflexed or effused. Pileus up to 3in. (7.5 cm.) laterally, 1½in. (3.7 cm.) from before backwards when laterally attached, forming patches up to 6in. (15 cm.) or more long when effuso-reflexed, sometimes subimbricate. Pileus velvety to strigose, zoned, often irregularly plicate, edge somewhat rounded, dark brown (approaching Warm Sepia, XXIX., and Auburn, II., Brussels Brown, III., more tawny than Cinnamon Brown, XV.). Hymenium smooth or with irregular folds, near Prout's Brown (XV.), Brussells Brown (III.), the growing edge near Antique Brown (III.). Cystidia acuminate, dark brown, 45 to 66 x 8.3 to 13.5 μ at the base. New South Wales.

Not yet recorded for South Australia.

409. **Hymenochaete tasmanica** Mass. ? (*Tasmanicus*, pertaining to Tasmania). —Receptacle entirely resupinate with no free margin, 2 x 1in. (5 x 2.5 cm.) or more, closely adherent, crustaceous, firm, brittle, cracking a little, surface rather irregular with occasional small nodosities, pruinose from the cystidia, about 0.3 mm. thick, near Snuff Brown (XV.) or Prout's Brown (XV.), the growing edge paler and more brightly coloured (Ochraceous Tawny, XV.). Hyphae thick-walled, irregular, yellowish brown, 3 to 7.5 μ. Cystidia tall, acuminate, narrow, 57 to 120 x 7 to 9.5 μ. Spores ? spherical, hyaline, 4 μ. South Australia—Mylor, National Park, Ravine de Casoars (K.I.). March, April, June.

THELEPHORA Ehrh. (PHYLACTERIA (Pers.) Pat.)

(Gr., *thēlē*, the nipple; *phoreo*, to bear.) (Gr., *phylacterion*, an amulet.)

"Fructifications pileate or clavate, coriaceous. Hymenium continuous with the hymenophore and similar to it, inferior or amphigenous in a few species, even or faintly ribbed or papillose. Basidia simple, 4-spored. Spores coloured, typically muricate but even, or rough-walled in a few species."—Burt.

410. **Thelephora terrestris** Ehrh. (Syn., *T. laciniata* Pers.) (L., *terrestris*, belonging to the earth).—Always found in Australia growing under or near species of *Pinus*, and therefore unquestionably an introduced species. Often forming a low irregular rosette, 6in. (12.5 cm.) or more in diameter, composed of the overlapping compressed pilei which are often more or less laciniate and very irregular, occasionally with the pilei more distinct and imbricate, rarely with occasional pilei definitely stalked, on the ground encrusting pine needles and sometimes attached to fallen pine chips or the bases of pine trunks. Pilei coarsely strigose, irregular and rough, dark brown becoming bleached greyish brown, often imperfectly developed; when young whitish and incrusting, then frondose. Hymenium irregularly rugose and minutely nodular, warm dark brown (near Verona Brown, XXIX., and Warm Sepia, XXIX., sometimes Cinnamon Drab, XLVI.). Sterile mycelium Cream Buff (XXX.). Spores angular, brown, 9.5 x 7 μ, 8 μ. South Australia—Under *Pinus insignis* Don. (*P. radiata* Dougl.) and probably other species of *Pinus*. Adelaide, Beaumont, Mount Lofty, Kuitpo Forest, Clarendon, Caroline State Forest (S.E.), Kalangadoo (S.E.). April to June.

CLADODERRIS Pers.

(Gr., *klados*, a branch; *derris*, a leathern covering.)

"Receptacle coriaceous, pileate, sessile or produced behind into a stem-like base. Hymenium inferior with fan-like folds or radiating, woody, branched ribs or veins. Spores white, elliptic oblong, smooth. Cystidia present. Growing on wood."—Rea.

No species recorded for South Australia.

SKEPPERIA Berk.

(Skepper, a personal name.)

"Receptacle very small with a short stalk expanding upwards to form a laterally in-rolled club-shaped or bonnet-shaped head, cellular externally, thread-like internally. Spores white. Cystidia 1-celled."—Killermann.

No Australian species recorded.

HYPOLYSSUS Berk.

(Gr., *hypo*, under; *lyo*, *lyso*, to loosen.)

"Receptacle stalked, almost bowl-shaped, the interior solid, corky. Hymenium inferior, smooth, shining."—Killermann.

No Australian species recorded.

2. Hymenium seated directly on the mycelium.

EPITHELE Pat.

(Gr., *epi*, on; *thēlē*, the nipple.)

"Receptacle waxy or floccose, resupinate, effused. Hymenium smooth, interspersed with scattered sterile protuberances, caused by the breaking through of fasciculate mycelial hyphae. Spores white, fusiform, smooth; basidia with 2-4 sterigmata. Cystidia none. Growing on dead leaves, herbaceous stems and wood."—Rea.

411. **Epithele glauca** (Cke.) Wakefield (Gr., *glaukos*, grey, pale-green, or greenish-grey).—Forming thin extensive effused, adglutinate, determinate, Dark Gray to Light Drab (XLVI.) patches, up to 5in. x 1½in. (12.5 x 3.7 cm.), usually smaller, often with outlying islands, occasionally cracking, densely beset with minute granules or spines which Miss Wakefield has shown to be composed of fascicles of sterile brownish hyphae covered with deposits of crystals. Spores "cylindric-ellipsoid, one side depressed, 8 to 9 x 2 to 2.5 μ" (Wakefield). South Australia—Blackfellows' Creek near Kuitpo (?). Queensland—Near Brisbane. New South Wales—Mosman, Hawkesbury River, Bulladelah. Victoria—Cresswick. June, August, November.

This is *Grandinia glauca* of Cooke (*vide* Handbook of Australian Fungi, No. 961) which Miss Wakefield has shown is not a *Grandinia* but belongs to the Thelephoraceae and seems best placed under *Epithele*.

ALEURODISCUS Rabenh.

(Gr., *aleuron*, flour, starch; *diskos*, a round plate.)

"Receptacle waxy floccose or crustaceous, becoming coriaceous; resupinate, saucer-shaped with a free margin, or effused and adnate. Hymenium smooth, pulverulent, often containing much granular or crystalline matter. Spores white, large, ovoid, elliptical or subgloboid; smooth or echinulate; basidia large with 4 stout sterigmata, intermixed with torulose, moniliform or racemose paraphyses or sterile basidia. Growing on wood."—Rea.

One species probably occurs in South Australia but awaits identification.

ASTEROSTROMELLA v. Höhnel et Litsch.

(Gr., *astēr*, a star; diminutive for *stroma*, anything spread out for lying or sitting upon.)

"Receptacle effused, crumbly, floccose, thin-membranaceous or almost waxy. Hymenium formed of sparsely distributed basidia in a felt work of dichotomous-branching ramifying paraphyses (dichophyses), colourless or poorly stained with pointed ends, basidia club-shaped with 2-4 sterigmata. Spores thin-walled, smooth, hyaline."—Killermann.

No Australian species recorded.

DENDROTHELE v. Höhnel et Litsch.

(Gr., *dendron*, a tree; *thēlē*, the nipple.)

"Like *Aleurodiscus* but with warty setae (dendrophyses) forming projecting structures on the hymenium."—Killermann.

No Australian species recorded.

CORTICUM (Pers.)

(L., *cortex*, bark.)

"Receptacle waxy, crustaceous or floccose; resupinate or effused. Hymenium smooth or tubercular, waxy, continuous, often cracked. Spores white, very rarely coloured; ovate, elliptical, globose, oboval, pip-shaped, pyriform, boat-shaped, almond-shaped, subtriangular, cylindrical, cylindric ellipsoid, oblong or sausage-shaped; smooth, rarely granular; basidia with 2-4-6-8 sterigmata, forming a homogeneous hymenium, sometimes accompanied with sterile basidia (cystidioles). Cystidia none. Growing on wood, more rarely on leaves or on the ground."—Rea.

KEY TO THE SPECIES OF *CORTICIUM*, *PENIOPHORA*, AND *SEBACINA*.

Cinnamon buff.
- Up to 25 cm., on dead wood, adnate, cracking into polygonal masses mostly 0.5 mm. in size, margin paler, subfloccose .. .. 412. *Corticium hydnans.*

Whitish to ivory yellow and light buff.
- Small encrusting patches, the margin radiating fibrillose .. .. 413. *C. radiosum.*

Light buff.
- Very extensive, thick, rarely cracking, covering irregularities of substratum, spores spherical, 5 μ .. .. 414. *C. portentosum.*

Pale smoke grey, mouse grey, or drab grey.
- Like a thin coat of paint, 2 to 5 x 0.5 to 1 cm. in size, tending to crack .. .. 417. *Peniophora cinerea.*
- Rather thick, tubercular, zonate within, 1 to 4 x 0.5 to 2 cm., sometimes as small round masses . 418. *P. violaceo-livida.*

Ivory yellow to pinkish buff.
- 11 x 3 cm., thin, adnate, tending to crack. Spores 13 to 16 x 5.5 to 8 μ .. .. 419. *P. montana.*

Warm buff to chamois (near mustard yellow).
- Fibrillose mycelial cords spreading under fallen bark, fructifications smooth, cream buff .. .. 420. *P. sulphurina.*

Whitish with greyish tinge.
- Like a thick layer of whitish paint, cracking, margin sharply defined .. .. 553. *Sebacina monticola.*

412. **Corticum hydnans** (Schw.) Burt. (Syn., *Radulum hydnans* Schw.; *Corticum colliculosum* Berk. et Curtis). (*Hydnans*, here *Hydnum*-like).—"Fructifications long and widely effused (1 to 10 cm. long, 1 to 3 cm. wide), adnate, thin, membranaceous, small pieces separable when moistened, pinkish-buff to cinnamon-buff in the herbarium, becoming more or less colliculose or somewhat tuberculate, cracking into polygonal masses 1 to 2 mm. in diameter, the margin whitish, with hyphae interwoven; in structure 100 to 300 μ thick, not coloured, with the hyphae longitudinally arranged next the substratum and then ascending and interwoven to the hymenium, 2 to 3 μ in diameter, not incrusted; no glococystidia; spores hyaline, even, 5 to 8 x 2.5 to 3.5 μ."—Burt.

New South Wales—A specimen from Macquarie Pass, August, 1917, identified by Prof. E. A. Burt, has fructifications 25 x 6 cm. in size, on dead wood, the colour near Cinnamon Buff (XXIX.), closely adnate, cracking into polygonal masses 0.3 to 1 mm. in size, the narrow margin paler and with a hand lens subfloccose. Not yet recorded for South Australia.

413. **Corticium radiosum** Fr. (Syn., *Thelephora radiosa* Fr.; *Corticium pelliculum* (Fr.) Karsten; *Corticium alutaceum* (Schrad.) Bresadola; *Glococystidium alutaceum* (Schrad.) Bourdot et Galzin). (L., *radiosus*, radiating).—"Fructifications 3 to 15 cm. long, 1 to 7 cm. wide, broadly effused, thin, membranaceous, tender, small pieces separable, from whitish to ivory-yellow and cream-buff in the herbarium, even, but little cracked, the margin white, broad, radiating, fibrillose; in section 100 to 300 μ thick, not coloured, composed of densely interwoven, ascending hyphae rather crowded together except where

separated by vesicular bodies which become greatly inflated and thin-walled and are finally up to 20 to 60 x 15 μ; spores hyaline, even or slightly rough, subglobose, 4.5 to 7 μ or 6 x 4.5 to 5 μ. On decaying wood of coniferous species usually.''—Burt.

Burt states that it may be recognised by its occurrence on coniferous wood, whitish or ivory-yellow colour, white fimbriate margin, subglobose spores about 6 μ in diameter and the presence in sections of very large vesicular bodies which may be so inflated and have walls so tenuous that they appear as vesicular spaces between the crowded hyphae.

South Australia—A specimen from Mount Lofty, June 21, 1924, was identified by Professor E. A. Burt. The fructifications are patchy, 3 to 6 x 1 cm. in extent, near Light Buff (XV.) or almost rusty-stained, paling towards the periphery, thin, on rough bark encrusting some debris of leaves, etc., the margin whitish, broad, radiating and fibrillose. Europe. North America. Alaska.

414. **Corticium portentosum** Berk. et Curtis. (Syn., *C. diminuens* Berk. et Curtis). (L., *portentosus*, portentous, strange).—''Fructifications long and widely effused (4 to 12 cm. x 2 to 4 cm.), thick, coriaceous-soft, small pieces separable when moistened, white, becoming light buff to warm buff in the herbarium, even, only rarely cracked, the margin often whitish, pubescent-villose; in section 150 to 1,000 μ thick, coloured like the hymenium, becoming zonate or stratose when thick, composed of very densely interwoven, tough hyphae, about 1 to 2 μ in diameter, not incrusted, not nodose-septate, protruding in the hymenial surface as curved paraphyses; more or less numerous aggregations of mineral matter may be immersed in the substance; no gloeocystidia; basidia few; spores hyaline, even, spherical, 4.5 to 7 μ in diameter, few present usually. In bark and wood of logs of frondose species.''—Burt.

Burt says that it may be recognised by its large, whitish, coriaceous fructifications on frondose logs, which become zonate within in thick specimens, and have globose spores 6 μ in diameter, and the slender branches of the interwoven hyphae exceeding the basidia and forming the hymenial surface.

South Australia and New South Wales—Specimens have been identified by Professor E. A. Burt from Kangaroo Island, May, 1925, and from Wingham, N.S.W. Fructifications very extensive, up to 30 x 10 cm. or more, covering the irregularities of dead wood, thick, Light Buff (XV.), only occasionally cracking; hyphae very fine, 1 to 1.5 μ, irregular, intricately interwoven; spores subspherical, 5 μ. Europe. South Africa. North and South America. West Indies. Philippine Islands.

CORTICIUM. SUBGENUS GLOEOCYSTIDIUM Karst.

(Gr., *gloios*, sticky; *kystis*, a bladder.)

''Differs from *Corticium* in possessing gloeocystidia, generally immersed in the tissue, which resemble cystidia, but their walls are never thickened or incrusted with crystalline deposits.''—Rea.

No Australian species recorded.

ASTEROSTROMA Masse.

(Gr., *astēr*, a star; *stroma*, anything spread out for lying or sitting upon.)

''Receptacle effused or reflexed, at first thread-like. Hymenium with star-shaped brown setae. Spores globose or elongated.''—Killermann.

415. **Asterostroma** sp.—Forming thin incrusting Honey-Yellow (XXX.) patches, up to 1in. x $\frac{1}{2}$in. (2.5 x 1.2 cm.), tending to run together, edge rather indefinite, surface subvillose. Substance with star-shaped and prong-like bodies, the prongs acicular and acute, 9 μ long, base 2.5 μ, yellowish, in a felted mass with the hyphae. Spores not seen. South Australia—Near Bakers Gully, Clarendon. June.

BONIA Pat.

(After Bon, a collector in East Asia.)

''Receptacle leathery or papery, reflexed or deeply concave. Hymenium rough with short, close-set many-celled setae almost Hydnum-like.''—Killermann.

No Australian species recorded.

CRISTELLA Pat. (**THELEPHORA** (Ehrh.) Fr. p.p.)

(L., *cristella*, a little crest.)

"Receptacle waxy, firm, effused, incrusting. Hymenium smooth or tubercular. Spores white, ovoid or oboval, echinulate; basidia clavate, with 2-4 sterigmata. Cystidia none. Growing on the ground, on wood, mosses or dead herbaceous stems."—Rea.

No Australian species recorded.

HYPOCHNUS (Fr.) Karst.

(Gr., *hypo*, under; *chnoos*, fine down.)

"Receptacle floccose or felt-like, resupinate, effused. Hymenium smooth or papillose. Flesh coloured, soft, loose. Spores coloured, rough, verrucose or echinulate; globose, subglobose, elliptical, ovoid or angular; basidia sometimes in scattered clusters, with 2-4 sterigmata. Growing on wood, mosses or on the ground."—Rea.

416. **Hypochnus cinerascens** Karst. ? (L., *cinerascens*, becoming ash-colour).—Receptacle 1½in. (3.7 cm.), effused, adnate, dry, floccose round the edge, hymenium minutely granular, between Drab and Hair Brown (XLVI.), edge pallid, flesh loose, easily disintegrated. Hyphae slightly tinted, rough from lime (?) encrustation, 3.7 to 5 μ. Spores nodular, dull greyish-brown, 5.5 to 7 μ. Following the inequalities of rough bark. South Australia—Mount Lofty. May. England.

HYPOCHNELLA Schroet.

(Diminutive of *Hypochnus*.)

"Same characters as *Hypochnus* but differing in the smooth, elliptical, violet spores. Growing on wood."—Rea.

No Australian species recorded.

JAAPIA Bres.

(After Otto Jaap.)

"Resupinate, effused, emarginate, flocculose-pulverulent, with the habit of some *Corticia* or of a pale *Hypochnus*. Spores straw-coloured, subelliptical, hyaline appendiculate."—Rea.

No Australian species recorded.

CONIOPHORA (DC.) Pers.

(Gr., *konis*, dust; *phero*, I bear.)

"Receptacle fleshy, waxy, subcoriaceous or membranaceous, resupinate, effused. Hymenium smooth, subundulate tubercular, or granular. Spores coloured, elliptical, navicular or subfusiform, smooth. Cystidia none. Growing on wood, or on the ground."—Rea.

One probable species has been collected in South Australia but has not yet been identified.

CONIOPHORELLA Karst.

(Diminutive of *Coniophora*.)

"Like *Coniophora* but with long, cylindrical cystidia."—Rea.

No species recorded for South Australia.

PENIOPHORA Cooke.

(Gr., *penion*, a shuttle; *phero*, I bear.)

"Receptacle waxy, coriaceous, cartilaginous, membranaceous, submembranaceous, floccose or filamentous; resupinate, effused. Hymenium waxy, floccose or pulverulent; smooth, rarely tubercular. Spores white, rarely pink, or yellowish,

elliptical, subelliptical, globose, subglobose, oboval, clavate, subcylindrical, fusiform, oblong, needle-shaped or sausage-shaped; smooth; basidia with 2-4 sterigmata, sometimes accompanied by cystidioles. Cystidia hyaline, rarely coloured, fusiform, oboval, elliptical, subglobose, subulate, conical, acicular, filiform, cylindrical, clavate or capitate, sometimes septate, and with clamp connections, smooth or incrusted with crystalline granules, generally thick-walled, sometimes thin-walled and then projecting, not immersed in the tissue. Growing on wood, more rarely on leaves or on the ground.''—Rea.

417. **Peniophora cinerea** (Pers.) Cooke. (Syns., *Corticium cinereum* Pers.; *Kneiffia cinerea* (Fr.) Bresad.; *Corticium fumigatum* de Thüm.; *Thelephora lilacina* Schw.; *Peniophora lilacina* (Sch.) Mass.) (L., *cinereus*, of an ash-colour).—''Fructifications 2 to 5 x 0.5 to 1 cm., when scattered 2 to 5 mm. in diameter, effused, closely adnate, very thin, in small patches becoming confluent, lurid, ashy in various shades as pale drab-grey, pale mouse-grey and cinnamon-drab, pruinose, waxy, becoming cracked in drying; in section 50 to 100 μ thick usually, brownish, darker and opaque near the substratum, the hyphae densely interwoven, 3 μ in diameter, somewhat coloured; cystidia incrusted, 25 to 40 x 4.5 to 9 μ, distributed throughout the section; spores hyaline, even, cylindric, 6 to 9 x 2 to 3 μ, borne 4 to a basidium. On fallen limbs of frondose and coniferous species. Probably cosmopolitan.''—Burt.

Burt states that it may be recognised by its resemblance to a thin coat of ashy grey or slightly tinted paint on the bark of fallen limbs; with a hand-lens the substance in sections is brownish.

New South Wales—A specimen from Milson Island, Hawkesbury River, April, 1915, has been identified by Prof. E. A. Burt. Fructifications as irregular patches, 4 x 0.5 cm. in size, very thin, like a slight coat of paint, near Pale Smoke Gray (XLVI.), tending to crack, margin a little indefinite.

418. **Peniophora violaceo-livida** (Sommf.) Bresadola. (L., *violaceus*, violet; *lividus*, dusky, livid).—''Fructifications 1 to 4 x 0.5 to 2 cm., often with the component masses rounded, 5 to 7 mm. in diameter, somewhat effused, closely adnate, rather thick, tubercular, pale mouse-gray to drab gray, often round; in section brownish, 100 to 300 μ thick, becoming zonate within, darker and opaque next the substratum, the hyphae somewhat coloured, densely arranged, erect; cystidia incrusted, 20 to 30 x 6 to 9 μ, distributed in all regions, very numerous; spores hyaline, even, curved, 6 to 9 x 2.5 to 4 μ. On fallen limbs.''—Burt.

South Australia—Mount Lofty (identified by Professor Burt), National Park. Europe. North America. June.

419. **Peniophora montana** Burt. (L., *montanus*, from the type having been found in a mountainous area).—''Fructifications effused, thin, adnate, tender, whitish to ivory-yellow, widely cracked in drying and showing the loose subiculum on the sides of the crevices, the margin thinning out, somewhat floccose; in section 200 to 225 μ thick, not coloured, composed of loosely interwoven, thin-walled, hyaline hyphae 4 to 5 μ in diameter, not incrusted, not nodose-septate, of irregular outline; no gloeocystidia; cystidia hair-like, not incrusted, conical, tapering to a sharp apex, 6 to 9 μ in diameter at the base, protruding up to 40 μ; spores hyaline, even, cylindric, slightly curved, 12 to 14 x 4 to 5 μ.''—Burt.

A specimen from Mount Remarkable, August, 1927, has been identified by Prof. E. A. Burt. The fructification, 11 x 3 cm. in extent, covers in rather a patchy fashion the inequalities of a fibrous bark, evidently from an Eucalypt. It is thin, adnate, Pale Pinkish Buff to Pinkish Buff (XXIX.), tending to crack a little in places, with a few small nodosities due to the substratum, the edge rather indefinite and with a lens subfloccose. Spores hyaline, elliptical, 13 to 15 x 5.5 to 7 μ. Another specimen is on old wood. Also Flinders Range, near Quorn, August, 1921 (spores 13 to 16 x 6.5 to 8 μ).

420. **Peniophora sulphurina** (Karst.) v. Höhnel et Litschauer. (Syns., *Tomentella sulphurina* Karst.; *Hypochnus sulphurinus* (Karst.) Sacc.). (L., *sulphurinus*, for *sulphureus*, colour of sulphur).—''Fructifications effused, 2 to 6 cm. long, 1 to 2 cm. broad, adnate, the hymenium drying clay colour, thin, brittle, even, here and there cracked and showing the mustard-yellow subiculum, the margin fibrillose-byssoid, mustard-yellow; in section 150 to 400 μ thick, pale yellow, with the hyphae loosely arranged, thin-walled, 4 to 6 μ in diameter, occasionally nodose-septate, some hyphae granule-incrusted; cystidia hair-like, not incrusted, 3 to 6 μ in diameter, protruding up to 30 μ, not numerous; spores hyaline, even, 3 to 4 x 2 to 2.5 μ.''—Burt. Europe. North America.

South Australia—A sterile specimen from Encounter Bay, January, 1925, has been identified by Professor E. A. Burt. Fructifications patchy, up to 15 x 4 cm., on the underlying side of thick sheets of fallen Eucalyptus bark. The periphery fibrillose-byssoid with coarse spreading strands, Warm Buff (XV.) to Chamois (XXX.), darker than mustard-yellow in colour. The consolidated older portion is smooth, almost glazed, Cream Buff (XXX.) and paler in colour. Hyphae 5.5 to occasionally 11 μ in diameter, occasionally septate, granule-incrusted, often flattened, yellowish. Also Mount Lofty (near Antimony Yellow, XV.). New South Wales—Neutral Bay (Warm Buff XV., under surface brighter, yellower than Yellow Ochre, XV., spores 5.2 to 5.5 x 2 μ, on fallen trunk). January, May, June, October.

WIESNERINA v. Höhnel.

(After Wiesner, an Austrian botanist.)

"Receptacle very small, hemispherical, on a narrowed base, bristly. Hymenium superior. Basidia with 2-4 sterigmata. Cystidia numerous, very long, lanceolate, rough, springing from the base of the receptacle. Spore smooth, white."—Killermann.

No Australian species recorded.

7. CYPHELLACEAE.

Hymenium covering the whole of the interior of cup-shaped, urceolate or cylindrical receptacles; smooth or veined.

CYTIDIA Quel. (= AURICULARIOPSIS R. Maire.)

(Gr., *kytos*, a hollow vessel.)

"Receptacle coriaceous-gelatinous, cup-shaped, sessile, scattered, crowded, or confluent. Hymenium smooth, becoming wrinkled or veined. Spores white or slightly coloured; boat-shaped, globose, or cylindrical; smooth; basidia elongate, narrow, cylindrical with 4 thin, short sterigmata. Growing on wood."—Rea.

No. 546, *Auricularia* sp. (see p, 329) proves to be **Cytidia flocculenta** (Fr.) v. Höhn. et Lits. National Park.

CYPHELLA Fr.

(Gr., *kyphella*, the hollow of the ear.)

"Receptacle waxy, membranaceous or subgelatinous, cup-shaped or urceolate; stipitate, sessile, or pendulous. Hymenium smooth, rugulose, or veined. Spores white, elliptical, obovate, globose, pruniform, subpyriform, ovate, clavate or pip-shaped, smooth; basidia clavate, with 2-4 sterigmata. Cystidia rarely present. Growing on wood, bark, herbaceous stems and mosses; scattered or gregarious."—Rea.

421. **Cyphella muscigena** (Pers.) Fr. (L., *muscus*, a moss; *genus*, birth).—Pure white, usually about $\frac{1}{8}$in. (3 mm.), sometimes $\frac{1}{4}$in. (6 mm.), *Cyphella*-shaped, occasionally more open, flaring or trumpet-shaped, sometimes with the edges turned out to form a slight flange, often deep and bell-shaped, or with a narrow mouth, externally slightly strigose or dull. Hymenial surface sometimes with folds which are rarely deep, irregular and gill-like with thick edges. Attached above by a narrow base. Spores pear-shaped, 8 x 6.5 μ. Attached to moss, under sides of stones, dead leaves, etc. South Australia—On a shady bank, Greenhill Road. July.

SOLENIA Hoffm.

(Gr., *sōlēn*, a pipe.)

"Receptacle coriaceous or membranaceous; tubular, cylindrical, cup-shaped or pyriform, sessile, seated on a superficial, felt-like, then floccose and fugacious mycelium. Hymenium smooth. Spores white, elliptical, cylindrical, globose, or subglobose; basidia clavate, with 2-4 sterigmata. Growing on wood, gregarious or fasciculate, rarely solitary."—Rea.

No South Australian species yet recorded.

POROTHELIUM Fr.

(Gr., *poros*, a pore; *thēlē*, the nipple.)

"Receptacles cup-shaped, sessile, more or less crowded, distinct, seated on or immersed in a membranaceous or floccose stroma. Hymenium smooth. Spores white, oblong, elliptical, or linear oblong; smooth; basidia with 2-4 sterigmata. Cystidia none. Growing on wood."—Rea.

No South Australian species yet recorded.

PHAEOCYPHELLA Pat.

(Gr., *phaios*, dusky; *kyphella*, the hollow of the ear.)

"Receptacle waxy, fleshy or membranaceous; cup-shaped or urceolate, sessile, pendulous. Hymenium smooth, rugulose or wrinkled. Spores coloured, elliptical or subglobose; smooth, punctate, verrucose, or echinulate; basidia with 2-4 sterigmata. Growing on wood or on mosses."—Rea.

No Australian species recorded.

CLAVARIACEAE.

Receptacle erect, dendroid, coralloid, simple or branched, never pileate. Hymenium more or less amphigenous.

CLAVARIA (Vaill.) Fr.

(L., *clava*, a club.)

"Receptacle fleshy or subcoriaceous, erect, branched or simple and clavate, smooth or longitudinally striate. Hymenium even, amphigenous, absent in the stem-like portion of the simple clubs. Spores white or ochraceous, rarely reddish ochre or brownish; elliptical, globose, subglobose, oboval, pip-shaped, pyriform, almond-shaped, reniform, oblong, oblong elliptical or subfusiform; smooth, punctate or verrucose; basidia with 2-4 sterigmata. Cystidia none. Putrescent. Growing on the ground or on wood; solitary, gregarious, caespitose or caespitose-connate."—Rea.

The genus comprises the fleshy Coral Fungi which may be simple club-shaped structures sometimes hollow and sometimes delicate, or sparingly branched in a regular or irregular manner, or antler-like in the branching, or repeatedly and densely branched to form coral-like masses or even to resemble a cauliflower. Some of the species are richly coloured in yellow, orange or buff.

KEY TO THE SPECIES.

Plants branched.

When mature more or less yellowish, buff, pinkish cinnamon or vinaceous buff. Spores mostly ochraceous.

Large, up to 5 to 10 cm. high. Base thick, of a single or of compacted stems.

Mustard yellow. Base of compacted stems. Ends of branches with blunt prongs. Spores 5.5 to 8 x 4 to 5 μ .. 422. *C. sinapicolor.*

Ochraceous salmon to ochraceous buff or capucine orange to orange buff. Cauliflower-like. Spores usually 9 to 10 x 4 μ .. .. 423. *C. ochraceo-salmonicolor.*

Vinaceous pink, vinaceous russet, vinaceous fawn or pinkish cinnamon. Spores 11 to 16 x 3.5 to 5.5 μ .. .. 424. *C. australiana.*

Pinkish tussore to brownish salmon. The slender primary branches becoming flattened, ending in slender processes. Spores subspherical, 5.2 to 7 μ .. .. 425. *C. complanata.*

Medium sized, under 5 cm.

Pale ochraceous buff, tough but flaccid. Stem short, branches crowded, erect. Spores 5.5 to 7.5 x 3.7 μ. Under conifers .. .. 426. *C. flaccida.*

Ochraceous buff. Stem slender, to 1in., with white mycelium. Spores slightly irregular, 5.5 x 3.5 μ. Under pines .. 427. *C. gracilis.*

Vinaceous fawn, vinaceous buff to pinkish cinnamon, ½ to 2in. Branches few or numerous, very irregular. Spores subspherical, 7 to 10 μ .. .. 428. *C. vinaceo-cervina.*

Small.

Delicate. Capucine yellow to chrome. Dichotomously forking 2 to 4 times. Spores slightly irregular, 4 x 3.5 μ .. 429. *C. crocea.*

Plants variously coloured, spores hyaline.

Whitish, very variable, small. Branches irregular, few or many, ends often cristate. Spores subspherical, 9 x 7.5 μ.. .. .. .. 430. *C. cristata.*

Drab (greyish), 1½ to 3in., simple to densely branched. Spores spherical, 8 to 9 μ .. 431. *C. cinerea* (see *C. vinaceo-cervina*).

Plants simple, rarely branched.
Tufted, sometimes single.
Yellow (salmon-orange in our plants), to 2½in., stout, thickest near the middle, hollow. Spores spherical, 4 to 5.8 μ .. .. 432. *C. fusiformis.*
Whitish, becoming buff when drying, rarely with short prongs. Spores 5.5 x 2 μ .. 433. *C. vermicularis.*
Solitary or in small groups.
White or pallid, about 1½in., clubs thickened upwards, rugose, sometimes irregularly branched. Spores subspherical, 5.6 to 7.5 μ .. .. 434. *C. subrugosa.*
Drab (greyish). Simple forms of .. .. .. 431. *C. cinerea.*
Coral red under whitish bloom .. .. 435. *C. corallino-rosacea.*
Capucine yellow, deep chrome, etc. Club-shaped, ½ to 2¼in., simple, occasionally pronged. Spores subspherical, 4 to 8 μ .. 436. *C. aurantia.*

[*Photo. by Jeffrey.*

Figure 58.—*Clavaria sinapicolor* **Clel. (No. 422). Mount Lofty.**

422. **Clavaria sinapicolor** Clel. (L., *sinapis*, mustard; *color*, colour).—Densely branched forming masses up to 2¼ x 2¼in. and 3 x 3in. (5.6 x 5.6 cm. and 7.5 x 7.5 cm.), near Mustard Yellow (XVI.) or yellower, Straw Yellow (XVI.) and Colonial Buff (XXX.), Naples Yellow (XVI.) or dingier, or Light Orange Yellow (III.), when old near Chamois (XXX.) but yellower towards the tips or near Cinnamon Buff (XXIX.), the bases of the branches paler, the stem whitish. The main branches are compacted into a broad mass at the base up to 1¼in. (3.1 cm.) thick. Dividing upwards repeatedly by very narrow angles into closely pressed nearly vertical more or less rounded rather slender slightly rugose branches, at first ¼in. (6.5 mm.), then ⅛in. (3.2 mm.) and then less in diameter, the last ¼ to ½in. ending usually in numerous rather blunt prongs, some very short, often with wider angles between them than in the branches. Spore mass slightly but distinctly buff-tinted or old gold. Spores obliquely pear-shaped to elliptical, slightly tinted microscopically, 5.5 to 8 occasionally 10.4 x 3.8 to 4.5, occasionally

5 μ. On the ground, usually in Eucalyptus (*e.g.*, *E. obliqua*) forests. South Australia—Mount Lofty, Kuitpo, National Park. New South Wales—National Park, Kendall, Milson Island in Hawkesbury R. May to August. (Figure 58.)

423. **Cavaria ochraceo-salmonicolor** Clel. (L., *ochraceus*, ochraceous; *salmonicolor*, salmon-coloured).—Compact, cauliflower-like, 1¾ to 4½in. (4.4 to 11 cm.) usually about 2½in. (6.2 cm.) high, 2 to 5in. (5 to 12.5 cm.) broad in larger specimens. From a thick pallid base up to 1in. (2.5 cm.) wide, dividing into stout branches (up to ⅜in., 10 mm., thick) and these again dividing three to five times to end in blunt prong-like processes capped by several blunt teeth a few mm. long, angles rather rounded, branches with longitudinal rugae. Colour Antimony Yellow (XV.), Light Ochraceous Salmon (XV.), Ochraceous Salmon (XV.), Light Ochraceous Buff (XV.) or Apricot Buff (XV.) when drying; when young Capucine Orange (III.), the tips yellower, which yellow may be lost when older; tips sometimes Warm Buff (XV.) or Ochraceous Buff (XV.). Spores elongated pear-shaped with an oblique apiculus, in the mass yellowish-brown, microscopically slightly tinted, 7.5 to 13 x 3.7 to 5.5 μ, usually about 9 to 10 x 4 μ. South Australia—Mount Lofty, Willunga Hill, Encounter Bay, Second

[*From watercolour by Miss Fireash.*

Figure 59.—*Clavaria australiana* **Clel. (No. 424). Mount Lofty.**

Valley Forest Reserve, Bangham (S.E.), McDonnell Bay (S.E.), Kalangadoo (S.E.), Caroline State Forest near Mount Gambier. Victoria—Ararat. New South Wales—Kangaroo Valley. April to July.

A more orange or yellow form also occurs in the same localities (*e.g.*, Mount Lofty, Willunga Hill), similarly cauliflower-like, of the same size, base whitish, main branches stout and rugose, dividing three or four times to end in short processes a few mm. long dividing into several small knob-like projections, angles sometimes acute, branches pressed together, flesh whitish, spores usually about 9 to 10 x 4 to 5 μ. Branches Pale Orange Yellow, Capucine Orange, Orange-Buff (III.), near Buff Yellow (IV.) or yellower to Antimony Yellow (XV.), or between Yellow Ochre and Buckthorn Brown (XV.). This, and especially the orange form, is probably the Australian representative of *Clavaria aurea* Schaeff. var *australis* Coker, Coker in "The Clavarias of the United States and Canada" describing the variety as being between capucine orange and orange buff of Ridgeway all over except the base which is nearly white, but easily staining vinaceous brown when handled (not noted in our plants). He gives the spores as 11 to 13 x 3.9 to 4.4 μ, minutely rough.

424. **Clavaria australiana** Clel. (*Australianus*, Australian).—Densely branched, 2½ to 6¼in. (6 to 16 cm.) high and 4 to 6¼in. (10 to 16 cm.) broad, the base up to 3in. (7.5 cm.) thick, first branches up to 2in. (5 cm.) thick, the main branches Vinaceous Pink, Buff Pink, Congo Pink, Vinaceous Russet, Pecan Brown, Walnut Brown (all XXVIII.), Light Vinaceous Cinnamon, Light Pinkish Cinnamon (XXIX.), Pale Brownish Vinaceous (XXXIX.), Vinaceous Buff or Vinaceous Fawn (XL.); the tips Vinaceous Fawn to Fawn Colour (XL.) or Japan Rose (XXVIII.). Contracting uniformly from above to a broad conical base of several stout compacted stems. The thick main branches spread somewhat and divide rather sparingly and very irregularly till the last ¾in. (1.8 cm.) is reached. Here they divide frequently into numerous blunt irregular prongs, often at wide angles, the prongs often divided again and flattened. The stout main branches and the branchlets are definitely rugose. Spore mass slightly but definitely coloured (pale ochraceous); spores microscopically slightly coloured, elongated, oblique, mummy-shaped, not striate, 11 to 13 to 16 x 3.5 to 5.5 μ, rarely 8.5 x 4 μ. On the ground. South Australia—Mount Lofty, National Park, Willunga Hill. April to July. (Figure 59.)

425. **Clavaria complanata** Clel. (L., *complanare*, to make flat).—Forming a mass 3in. (7.5 cm.) high and 5in. (12.5 cm.) broad. From the solid base dividing repeatedly into slender branches which then become flattened and expanded, and then again divide into slender digitate processes ¼in. (6 mm.) long, pale pinkish tussore, becoming brownish salmon, when damp staining paper pinkish salmon. Spores hyaline, subspherical, 5.2 to occasionally 7 μ. New South Wales—Sydney suburb, probably Hornsby. June.

426. **Clavaria flaccida** Fr. (L., *flaccidus*, flabby).—Up to 1¼in. (3 cm.) high, Pale Ochraceous Buff (XV.), stem sometimes Light Ochraceous Buff, with some white mycelial threads amongst the moss in which it grew. Much branched from a usually short stem; branches crowded, erect, tending to be flattened, sometimes slightly rugose, ends more or less cristate with short acute processes. Spores pear-shaped, oblique, slightly tinted, microscopically, 5.5 to 7.5 x 3.7 μ. South Australia—In moss under *Callitris propinqua* R.Br. (Pinaceae), Bangham Forest (S.E.). May.

This Australian plant seems best referred to *C. flaccida* Fr. of Europe, the United States, etc. This is characterised by its growth amongst moss and leaves in coniferous woods; small size (3 to 4 cm.), tough but flaccid texture; bright ochraceous colour with paler tips and whitish base; crowded, erect and repeatedly forked branches with the upper axils rounded; and ochraceous spores very finely punctate or minutely warted. *C. abietina* Fr. is similar but larger and turns green when bruised.

427. **Clavaria gracilis** Pers. (L., *gracilis*, slender).—Variable in size and shape, growing in tufts, sometimes with sheets of white mycelium at the base, up to 1½ to 2½in. (3.7 to 6.2 cm.) high, with a slender stem (4 mm. thick), sometimes 1in. (2.5 cm.) long but usually shorter, repeatedly branching in an upright fashion like the branches of a tree or spreading laterally (up to 1½in., 3.7 cm.), in general appearance of a pale buffy tint (between Light Ochraceous Buff and Warm Buff, XV.; Pale Ochraceous Buff, XV.), the colour persisting to the base, apices paler. After branching several times, sometimes antler-like, the stems end in short acute processes several mm. long terminating in sharp teeth presenting sometimes a cristate appearance, branches sometimes flattened, sometimes rugose. Spores oblique, slightly irregular, microscopically slightly tinted, 5.5 x 3.5 μ. In tufts, sometimes with a suggestion of ring formation, on the forest floor under *Pinus radiata* Don. (*P. insignis* Dougl.). South Australia—Mount Burr State Forest (S.E.). United States of America. May.

428. **Clavaria vinaceo-cervina** Clel. (L., *vinaceus*, wine-coloured; *cervinus*, fawn).—Plants ½ to 2in. (1.2 to 5 cm.) high, nearly vertical or slightly spreading, from a short stem-like base very irregularly branching, sometimes with only a few branches or prong-like divisions, sometimes with a number of small branches, ultimate divisions short, prong-like, mostly blunt, sometimes acute and thorn-like, sometimes awl-like or finger-like, often fastigiate, the branches often irregularly flattened and the whole plant rugose, usually relatively slender but in some collections stouter and more knobby, Vinaceous Fawn (XL.) to Fawn Color (XL.), near a pale Vinaceous Russett (XXVIII.), deeper than Vinaceous Buff (XL.), between Vinaceous Buff and Avellaneous (XL.), Vinaceous Pink (XXVIII.) at the tips with the stem Vinaceous Fawn (XL.), greyer than Buff Pink (XXVIII.), or

Pinkish Cinnamon (XXIX.) with a fine bloom giving a vinaceous pink colour tinge on the pinkish cinnamon, base of stem pallid. Spores subspherical, 6.8 to 9 μ, 8 x 6.5 μ, 9 to 10 x 8 to 8.8 μ. On the ground under trees amongst shrubs. South Australia—Stirling West, Mount Lofty, Belair, Clare. April, June to August. (Plate VIII. Figure 3.)

Before describing this species as new, a specimen was submitted to Miss E. M. Wakefield of Kew who reported that it was probably new and not a European or American species. The specimens, described further on under No. 431, *Clavaria cinerea*, seem to be merely drab-coloured forms of this species. As, however, they agree well with the descriptions of *C. cinerea*, they have been placed provisionally under that species. Probably *C. vinaceo-cervina* is the Australian representative of *C. cinerea*.

429. **Clavaria crocea** Pers. (L., *croceus*, saffron-coloured).—Capucine Yellow to Deep Chrome (II.), about $\frac{3}{4}$in. (1.8 cm.) high, dichotomously forking 2 to 4 times, angles rounded, ultimate segments slender, rounded, short or long, blunt or ending in a more acute point. Spores pear-shaped, sometimes faintly irregular, coloured, 4 x 3.5 μ. South Australia—In dense undergrowth in stringy-bark forest, Eagle-on-the-Hill. United States of America. June. (Figure 60.)

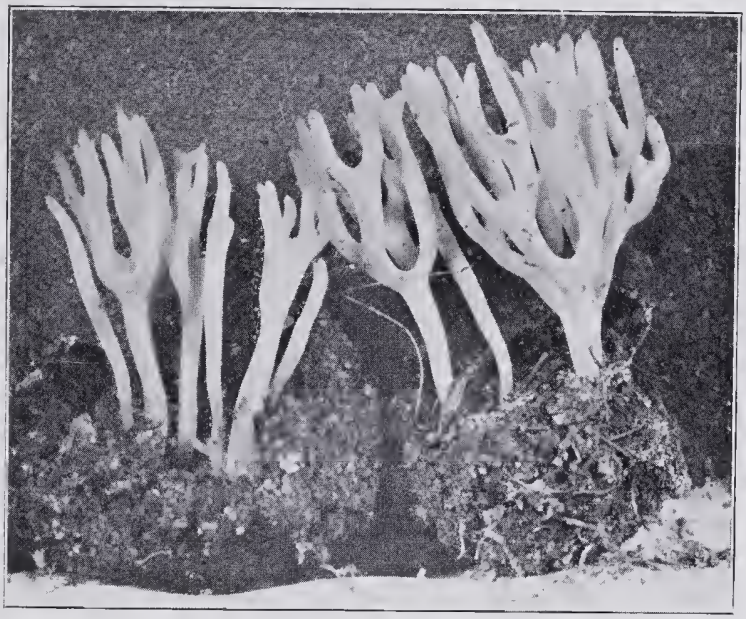


Figure 60.—*Clavaria crocea* Pers. **(No. 429). Eagle-on-the-Hill. X3.**

430. **Clavaria cristata** (Holmsk.) Fr. (L., *cristatus*, crested).—Whitish, about $\frac{3}{4}$in. (18 mm.) high. Compactly branched from a base of several relatively stout short branches, the terminal branches showing a number of usually acute short prong-like processes. Spores pear-shaped to subspherical, 9 x 7.5 μ, 7.5 x 5.5 μ. South Australia—Beaumont near Adelaide. Europe, etc. June.

431. **Clavaria cinerea** (Bull.) Fr. ? (L., *cinereus*, the colour of ashes).—Light Cinnamon Drab, Cinnamon Drab, Drab (XLVI.) or greyer, or Buffy Brown to Olive Brown (XL.), sometimes more pallid at the base, when dry grey pruinose with the tips blackish. Variable, 1$\frac{1}{2}$ to 3in. (3.7 to 7.5 cm.) high and up to 2in. (5 cm.) broad, sometimes relatively simple with a moderately stout stem attenuated at the base, more or less nodular, ending in several tubercular knobs or branching irregularly to end in short prongs; sometimes from one or several stems dividing frequently and irregularly into somewhat flattened, more or less tuberculate-rugose, upwardly directed or slightly spreading, branches ending in short nodular or subacute prongs. Sometimes caespitose. Spores subspherical, with a gutta, 8 to 11 μ, 9 x 7.5 μ. South Australia—Mount Lofty. June, July.

See the remarks under No. 428, *C. vinaceo-cervina*.

432. **Clavaria fusiformis** (Sow.) Fr. (L., *fusus*, a spindle; *forma*, shape).—Caespitose to connate, rich salmon-orange becoming more salmon tinted. Clubs 2½in. (6 cm.) x ¼in. (6 mm.) thick, narrow, spindle-shaped, often twisted, sometimes compressed, hollow, the cavity lined by pallid salmony-white flesh, the outer flesh darker, finally sometimes bursting irregularly above with yellowish tips, leaving an irregular trumpet-shaped opening. Sterigmata 4, sometimes 2; spores subspherical, smooth, white, 4 to 5.8 μ. New South Wales—Under moist rocks, Hawkesbury River; Narrabeen. Europe. United States of America. January, August, November.

433. **Clavaria vermicularis** Fr. (L., *vermicularis*, worm-like).—White with a tint of Warm Buff (XV.) at the apices. Densely tufted, 1in. (2.5 cm.) high, rather club-shaped, attenuated downwards, simple or with occasional knobs or one or two short apical prongs, apices blunt (acute in British specimens). Spores 5.5 x 2 μ. South Australia—On the ground, MacDonnell Bay (S.E.). May.

434. **Clavaria subrugosa** Clel. (*Sub*, here near the species *C. rugosa* Fr.).—White becoming slightly dingy, pallid whitish becoming pale greyish brown, pallid greyish white or near Cartridge Buff (XXX.). Up to 1¼ to 2in. (3.1 to 5 cm.), base slender, expanding a little upwards, sometimes flattened, simple or dividing irregularly into several upward terete filiform or flattened prongs or lobes, more or less irregularly rugose, solid. In small groups. Spores spherical, 5.6 to 7.5 μ. South Australia—Mount Lofty, National Park. April, June, July.

The spores for British specimens of *C. rugosa* are given by Cotton and Wakefield as 9 to 11 x 8 to 9 μ. Coker ("The Clavarias of the United States and Canada") places *C. rugosa* as a form of *C. cristata* which he considers as very variable. We have cristate plants which we assign to *C. cristata* and it seems advisable to apply a definite name to these more simple, non-cristate specimens whose spores do not agree in size with *C. rugosa* of the English authors.

435. **Clavaria corallino-rosacea** Clel. (Gr., *korallion*, coral; L., *rosaceus*, rosy).—Clubs simple, occasionally forked several times, up to 1½ to 2¼in. (4 to 5.6 cm.) high, prongs when present up to 1 cm. long, slender, attenuated downwards and also sometimes upwards, sometimes rather flattened and grooved, solid, coral red or rosy pink (when moist a little pinker than Morocco Red, Dauthenay, Pl. 95, Ton. 1; when drying shades of Coral Red, Pale Scarlet, Salmon Pink, Pl. 76), often pruinose above, when buried under leaves base whitish. Flesh light coral red. Spores somewhat pear-shaped, 6 x 3.4 to 4 μ. On the ground, sometimes under *Lantana*. New South Wales—Mosman and Neutral Bay, Sydney. April and June.

436. **Clavaria aurantia** Cooke et Massee. (L., *aurantius*, orange coloured).—Simple, very rarely with several small prongs above, single or in groups, occasionally tufted, ½ to 2¼in. (1.2 to 6.2 cm.) high, club-shaped, up to 4 mm. thick above, attenuated downwards becoming often very slender below, rarely attenuated both ways, often twisted, occasionally slightly rugose above, sometimes slightly flattened, Capucine Yellow (III.), Deep Chrome (III.), Light Cadmium (IV.), or Yellow Ochre (XV.), when dry. Spores subspherical, faintly tinted, 4.1 to 8 μ (in one collection, noted as "distinctly rough"). On bare ground or amongst moss. South Australia—Mount Lofty. New South Wales—National Park. Victoria. Queensland. May to July.

There seems little doubt that this is the species described by Cooke and Massee from Victoria as *C. aurantia*. Miss Wakefield informs me that at Kew, under this species, they have the type from the Harkaway Ranges, Victoria, and also specimens from the Bellenden Ker Range in Queensland. She finds the spores to be hyaline, 6.5 to 7 x 4.5 to 4.8 μ. We have not found specimens as tall as 8 cm., as in Cooke's description ("Handbook of Australian Fungi," No. 1131). Coker ("The Clavarias of the United States and Canada"), under *C. aurantio-cinnabarina* Schw., says that "in Bresadola's herbarium is a specimen of *C. aurantia* Cooke (No. 50, probably a part of type) which has exactly the appearance of the present species (*i.e.*, *C. aurantio-cinnabarina*) in the dried state and is probably a close relative. The spores are slightly different, being a little more elongated, 4.5 to 5 x 7 to 7.4 μ." In our dried specimens, the blunt ends or tips of the clubs are not sharply different from the clubs or of a deeper ochraceous red colour, though they are smooth and unwrinkled and larger (except the extreme tip)—features he finds characteristic of *C. aurantio-cinnabarina*.

TYPHULA (Pers.) Fr.

(L., *typha*, the reed-mace.)

"Receptacle fleshy, waxy or tough, erect, simple, very rarely branched, cylindrically clavate, with a long thin stem, often springing from a sclerotium. Hymenium smooth, confined to the clavate portion of the receptacle. Spores white, oblong, ovate, subglobose, pip-shaped, or cylindrical, smooth; basidia clavate, with 2-4 sterigmata. Cystidia none or inconspicuous. Growing on dead leaves, herbaceous stems, twigs and wood."—Rea.

437. **Typhula juncea** (Fr.) Karst. (L., *junceus*, rush-like).—Receptacle simple, filiform; stem 1¼in. (3.1 cm.) high, pale Snuff Brown (XXIX.); club 2½in. (6.2 cm.) high, paler. Attached by a minutely strigose disc to fallen pine-needles. Spores pear-shaped, 5.5 to 7 x 3.7 to 4 μ. South Australia—In pine forest, Kalangadoo. May.

Though the stem is much shorter and the colouring is slightly different, the following seems also to belong to this species:—Receptacle simple, up to 1¼in. (3.1 cm.) high, very slender (about 0.75 mm. thick); stem about ¼in. (6 mm.) long, pallid yellowish; club only slightly thicker than the stem, attenuated towards the rather blunt apex, slightly pruinose, opaque white, when young pallid brownish. Tough-fleshy, becoming pallid. Attached by a slightly swollen disc with minute strigose hairs to dead wood. Spores pear-shaped, 7.5 to 8 x 4.5 μ. South Australia—National Park. July.

PISTILLARIA Fr.

(L., *pistillum*, a pestle.)

"Receptacle fleshy or waxy, erect, simple, very rarely forked, club-shaped with a short, thick glabrous or villose stem, rarely springing from a sclerotium. Hymenium smooth, confined to the clavate portion of the receptacle. Spores white, oblong, elliptical, subcylindrical, pruniform, oblong, oblong elliptical or sausage-shaped, smooth; basidia clavate, with 1-2-4 sterigmata. Cystidia none or inconspicuous. Growing on dead herbaceous stems and leaves."—Rea.

No species recorded for South Australia.

PTERULA Fr.

(Gr., *pteron*, a feather.)

"Receptacle firm, tough, filiform, branched or simple, branches equal. Hymenium smooth. Spores white, oval, elliptical or pip-shaped, smooth; basidia with 2-4 sterigmata. Cystidia none or inconspicuous. Growing on the ground or on wood."—Rea.

No species recorded for South Australia.

GASTEROMYCETES.

The second main division of the Basidiomycetes consists of the Gasteromycetes which include the puff-balls and allied plants. Here the hymenium or spore-bearing surface is not exposed from an early stage but is contained within a continuous membrane, the peridium, the spores being liberated in various ways when mature. Thus the peridium or "cover" may rupture to enable the spores to be exposed, or it may disintegrate and allow the spores to escape as dust, or the spores may issue out of definite orifices as in the puff-balls, or the plant may actually have to decay to enable the spores to reach the outside world.

The Gasteromycetes are divided into five main divisions. The first of these, the Phallales, comprises the various, often remarkable and highly coloured phalloid fungi or stinkhorns and the lattice-fungi. In the young stage, the fungus appears as a globose phalloid "egg" which may be an inch or more in diameter. If such an egg be cut open, there will be seen inside, embedded in the gelatinous middle layer of the peridium or enclosing covering, a folded structure on which may be seen the dark green gleba containing the spores. At maturity, the outer layer of the peridium ruptures through swelling of the jelly-like layer and this enables the folded structure, the receptacle, to expand, carrying with it the spore mass. The receptacle may consist of a hollow cylindrical or fusoid structure, which may or may not possess a cap, or may have arms or tentacle-like processes extending upwards or outwards from a flaring or cylindrical tube, or the receptacle may consist of a lattice which may be white or red. The crinoline fungi have, in addition to a cap, a net-like structure depending from the upper part of the receptacle and hanging downwards and outwards so as to resemble a crinoline; the net, and the stem and pileus supporting it, may be brilliantly and variously coloured. *Aseroe rubra*, a common phalloid in the coastal areas of New South Wales, is very like a long-stalked sea-anemone with bright red disc and arms.

Most of the phalloid fungi have a foetid smell which occasionally may be so strong as to be noticeable when walking past one of them, before the fungus itself is seen. The smell is faecal or like highly tainted meat. Carrion-visiting flies may be attracted by the smell, though I have not noticed this in connection with our Australian species. When thus visited by a fly, the spores are doubtless distributed partly by being ingested and passed through the alimentary canal, and partly by external contamination of the insect's legs.

South Australia is not rich in species or in individual members of the phalloid fungi. The commonest is the lattice-work fungus, *Clathrus gracilis*, which may be found in the Mount Lofty Ranges, the slender-barred white lattice being readily dislodged from the cup-shaped volva in which some of the gelatinous layer will be found remaining. The thicker-barred *Clathrus cibarius* has only been found once. Occasionally in the autumn after heavy rains or profuse watering, the quaint *Lysurus sulcatus* may come up in the suburbs of Adelaide, especially on buffalo-grass lawns; it has a long white to cream-buff hollow cylindrical stem from the apex of which project five to seven erect rugose arms. The brilliant red or reddish *Ithyphallus rubicundus* has been found once in a buffalo-grass lawn in an Adelaide suburb and twice in the South-East, and *Colus hirudinosus*, a red clathrate species, has been found once.

Australia is unusually rich in species belonging to the second main division, the Hymenogastrales. In the Hymenogastraceae, the little more or less globose plants are often partly buried in the ground or are found covered by loose debris and sticks and disclosed by scratching these away. Two species of *Rhizopogon* are found, more or less emerged from the ground, in association with species of *Pinus* and, as already mentioned in the first part of this work, it is thought that there is an association between the mycelial strands of the fungus and the rootlets of *Pinus* which is in some way advantageous to the latter and which consequently helps pine-seedlings to establish themselves. The Hymenogastraceae are unstalked but in the Secotiaceae the plants possess a more or less evident stem. A remarkable and interesting feature in the genus *Secotium* is the resemblance that some species have to malformed agarics. It has in fact been suggested that they are arrested forms of the Agarics, producing spores in a partly developed state (paedogenesis). Dr. G. H. Cunningham has found that in the early stages of development they do resemble agarics but the nature of the gleba and the peridium link them to the Hymenogastraceae. *Secotium melanosporum*, which may be found at Monarto South, has a close

resemblance to a partly opened common mushroom, *Psalliota campestris*, having a veil which on removal discloses, instead of lamellae, dark sepia-brown chambers (as if cross-partitions had united the gills), some of the lowermost of which may be open; the colour of the upper surface is not unlike the cap of a mushroom, the spores in colour and shape resemble those of *Ps. campestris* though they may be a little larger, and even the colour is similar; moreover mushrooms grow in the neighbourhood. *Secotium agaricoides* also closely resembles the mushroom. At Mount Lofty, *S. leucocephalum*, with rough, pallid ferruginous spores, suggested when gathered a malformed species of *Cortinarius*, of which several species occur in the neighbourhood. Again *S. Rodwayi*, with globose, warty, hyaline spores was found growing near where species of *Russula* occurred. One species, *S. coaretatum*, has a characteristic, penetrating, fragrant odour.

The third division, the Lycoperdales, contains four families, the first containing the greatest number of genera and species. Australia is rich in the species of small puff-balls (*Lycoperdon*), common in fields, etc., and opening by an apical mouth, as well as in the allied *Disciseda* in which the outer part of the peridium remains as a discoid basal portion. *Lycoperdon depressum* may form rings in grass land and has given trouble in Melbourne by disfiguring playing lawns. The young stage of this species and of others, while the flesh is still free from colour, is edible. *Bovista* is a genus of small puff-balls which when mature are readily detached from the ground and blown about. The species of *Calvatia* and *Mycenastrum* are mostly large, the former disintregating irregularly when mature, *Mycenastrum* usually in a stellate way. In the tribe Mesophellieae are two genera of subterranean plants, *Mesophellia* and *Castoreum*, which in several species only appear above ground as the result of being scratched up by rabbits or marsupials. These species have a strong, peculiar and penetrating smell which presumably attracts the animals. Empty husks may be found beside the scratchings, showing that the fungi are eaten, but not infrequently unopened examples may also be collected, perhaps because the animal has been disturbed before it was able to eat the fungus. The gleba of these plants is of a peculiar grey colour. A third tribe, the Geastreae, contains the beautiful earth-stars of the genus *Geaster*, in which Australia is unusually rich.

In the family Tulostomataceae we have a number of stalked puff-balls, some of which are of large size and remarkable appearance. We are again very rich in species which occur particularly in the mallee areas and the far interior, especially in sandy parts. *Podaxon pistillaris*, with a stem up to three inches long and an ovate-oblong peridium which can readily be detached exposing the deep purple gleba clinging to the stem, is used by the natives of Central Australia as a powder-puff for decorating the face. *Phellorina* and *Chlamydopus* are interior species growing in sandy soils. There are a number of rather small species of *Tulostoma*, like little drum-sticks, the stalk fitting in to a depression in the head. *Battarraea Stevenii* is quite common in sandy areas, as in the mallee country, and may reach a very large size; externally it is rather the colour of straw; the almost woody stem, which may reach 14ins. in length, is covered with shaggy overlapping scales; the peridium is discoid and may reach two and a half inches in size; the upper portion comes away as a concave disc, exposing the ochraceous gleba situated on a disc-like expansion of the apex of the stem.

The Sclerodermatales comprise firstly the Sclerodermataceae in which family the genus *Scleroderma* has thick yellowish-brown walls which split to allow the gleba to disintegrate, and the genus *Pisolithus* has lenticular chambers which, as the top disintegrates more and more, break down into an umber-brown powder. *Pisolithus tinctorius* is quite common round Adelaide and may reach a size of over 7in.; it may often be seen as a slightly moist greenish-brown projecting mass which, on kicking it, breaks up into a cloud of ochraceous to umber dust. In the Calostomataceae we have the queer fungus *Calostoma* (*Mitremyces*) *fuscum*, with a rugged-looking base capped by a globose receptacle with a vermilion mouth surrounded by small teeth.

The fifth main division, the Nidulariales, contains the small bird's-nest fungi, little often lead-coloured cups containing flattened discs (peridiola) which may or may not be attached by threads. Several species occur in South Australia but they are not common. The family Sphaerobolaceae is represented by the minute *Sphaerobolus stellatus*, found on rotting wood in our National Park, with a cup-shaped peridium up to 2 mm. diameter, containing a little globose peridiolum (containing the spores) which becomes extruded and may be thrown a distance of 4in. by the sudden eversion of the endoperidium.

The Australian species of the Gasteromycetes have been thoroughly studied by Dr. G. H. Cunningham, Mycologist to the Dominion Government of New Zealand. All the collections, totalling over 900, made by myself have passed through his hands and been critically examined by him. The results of his work have appeared mostly in the Transactions of the Linnean Society of New South Wales from 1924 to the present time. By his permission I have been allowed to abstract from these papers the detailed descriptions that he has so carefully prepared, and incorporate those portions that apply to South Australia in the present work. I would like here to express my sincere gratitude to him for this generosity.

CLASSIFICATORY KEY TO THE GASTEROMYCETES.*

I. PHALLALES.

Peridium of two or three layers, enclosing the receptacle and gleba, rupturing apically and remaining at the base of the receptacle as the volva. Receptacle of pseudoparenchyma, bearing the gleba on some portion of its surface. Gleba at maturity mucilaginous, olivaceous, and usually foetid. Basidia 4 to 8-spored. Spores smooth, usually elliptical.

PHALLACEAE.

Receptacle stipitate, cylindrical or fusoid, with or without an apical campanulate pileus, and indusium; gleba borne upon the exterior of the pileus, or directly upon the modified apex of the stem.

- Gleba borne directly upon the apical portion of the receptacle.
  - Gleba covering the apical portion of the receptacle .. .. *Mutinus.*
  - Gleba forming a collar-like constriction below the inflated apex of the receptacle .. .. (*Staheliomyces*)†.
- Gleba covering a net-like pileus loosely attached to the apical portion of the receptacle .. .. (*Floccomutinus*).
- Gleba borne on a campanulate pileus.
  - Indusium absent, or present only in rudimentary form.
    - Pileus formed of radiate plates .. .. (*Aporophallus*).
    - Pileus formed of lamellate plates .. .. (*Itajahya*).
    - Pileus even; exteriorly rugulose, papillate or reticulate .. .. *Ithyphallus.*
  - Indusium present and well developed.
    - Pileus strongly convoluted .. .. (*Clautravia*).
    - Pileus reticulated .. .. *Dictyophora.*

CLATHRACEAE.

Receptacle stipitate or sessile; clathrate, columnar or stipitate when divided above into several arms. Gleba borne on the interior, exterior of or between the arms.

STELLATEAE.

Receptacle stipitate, of simple arms borne at the apex of a simple hollow stem; arms either apically organically united, connected with a membrane, free and connivent, or laterally expanded.

- Arms organically united apically, or united by a membrane.
  - Glebiferous layer of irregular pseudoparenchymatous processes .. .. (*Mycopharus*).
  - Glebiferous layer consisting of the unaltered walls of the chambers of the arms .. .. *Anthurus.*

* The terminology is that adopted by Dr. Cunningham, who has kindly supplied this Key.

† Genera not recorded for Australasia.

Arms apically free, conniveut or expanded.
Arms connivent (usually) attached to the apex of a simple cylindrical stem .. .. *Lysurus.*
Arms attached laterally to a horizontal discoid expansion of the apex of the cylindrical stem *Aseroe.*

COLUMNATEAE.

Receptacle without a stipitate base, of simple columnar arms organically united apically, but free basally.
Gleba attached to the inner surfaces of the columns.
Columns transversely rugose or smooth .. .. .. *Lindcria.*
Columns with lateral winged expansions .. .. .. (*Blumenavia*).
Gleba attached to a pendent pulvinate structure attached to the ventral surface of the apex of the united columns .. .. (*Laternea*).

CLATHRATEAE.

Receptacle of arms anastomosed to form a globoid, hollow, sessile clathrate sphere, of arms clathrately arranged above but columnar below, and/or basally united to form a short cylindrical stem, or clathrate and supported upon a definite stem.
Receptacle with a definite cylindrical stem.
Receptacle arms with numerous capitate or clavate lobes attached exteriorly .. .. (*Kalchbrennera*).
Receptacle arms not lobed .. .. (*Simblum*).
Receptacle clathrate above, arms below columnar and united basally to form a short cylindrical base .. *Colus.*
Receptacle sessile, or practically so, clathrate .. .. *Clathrus.*

CLAUSTULACEAE.

Receptacle sessile; an obovate or spherical apparently indehiscent hollow sphere; gleba lining the inner surface.
With the characters of the family .. .. *Claustula.*

II. HYMENOGASTRALES.

Peridium of 1-3 layers, or occasionally wanting at maturity, indehiscent, stipitate or sessile. Gleba composed of numerous tramal plates anastomosed to enclose numerous labyrinthiform or subglobose cavities, persisting at maturity, save in a few species; capillitium absent. Basidia 1 to 8-spored. Spores hyaline or coloured, variously shaped, smooth or variously sculptured.

HYMENOGASTRACEAE.

Peridium sessile, indehiscent, tuberiform, often hypogaean, of 1 or 2 layers, attached to the substratum by numerous lateral and/or basal mycelial strands.

RHIZOIDEAE.

Peridium with lateral (and basal) mycelial strands.
Spores elliptical and smooth.
Spores hyaline or tinted only .. .. *Rhizopogon.*
Spores deeply coloured .. .. *Melanogaster.*
Spores globose and verrucose .. .. (*Scleroga*ster.)

HYMENOGASTREAE.

Peridium with radicate mycelial strands.
Spores globose.
Gleba traversed by an evident simple or dendroid columella .. .. *Hydnangium.*
Gleba without a columella .. .. *Octaviania.*
Spores elliptical.
Gleba without a columella .. .. *Hymenogaster.*

Gleba traversed with an evident simple or dendroid columella.
Spores smooth .. .. *Hysterangium.*
Spores verrucose or areolate .. .. *Dendrogaster.*
Spores longitudinally ribbed .. .. *Gautieria.*

SECOTIACEAE.

Peridium indehiscent, usually epigaean, carried upon a prominent stem which traverses the gleba as a columella, of 1 or 2 layers.
With the characters of the family .. .. *Secotium.*

III. LYCOPERDALES.

Peridium usually epigaean, sessile or stipitate, of 2, 3, or 4 layers, dehiscing by an apical pore (or by several such), by weathering of the apex of the endoperidium, circumscissile cleavage of the endoperidium, or by irregular rupture of this membrane. Gleba at maturity pulverulent, with a copiously developed capillitium. Basidia 1 to 8-spored. Spores hyaline or coloured, variously shaped, smooth or variously sculptured.

TULOSTOMATACEAE.

Peridium stipitate, of 2 layers, borne at the apex of a simple but well developed stem which in *Podaxon* traverses the gleba as a columella. Basidia bearing 1 to 4 spores, which may be apically or laterally (*Tulostoma*) attached.

PODAXONOIDEAE.

Basidia arranged in fasciculate clusters which are persistent at maturity.

PODAXONEAE.

Peridium carried at the apex of a stem which traverses the gleba as an axile columella, dehiscing by longitudinal fissuring .. .. *Podaxon.*

PHELLORINEAE.

Peridium seated on the flattened expanded apex of the stem.
Peridium dehiscing by irregular weathering of the apex of the peridium .. .. *Phellorina.*
Peridium dehiscing by a definite apical stoma .. .. *Chlamydopus.*

TULOSTOMOIDEAE.

Basidia not fasciculate, disappearing at maturity.

TULOSTOMEAE.

Elaters not present in the gleba.
Peridium dehiscing by a definite apical stoma .. .. *Tulostoma.*
Peridium dehiscing by irregular weathering of the apex of the peridium .. .. (*Queletia*).

BATTARRAEAE.

Elaters present in the gleba.
Peridium dehiscing by circumscissile cleavage of the apical hemisphere of the peridium .. .. *Battarraea.*

LYCOPERDACEAE.

Peridium sessile, of 2, 3 or 4 layers, dehiscing by an apical stoma, or by several such, by weathering of the apex, or irregular rupture. Basidia 4 to 8-spored. Spores globose or elliptical.

LYCOPERDEAE.

Peridium of 2 layers, dehiscing by an apical stoma, by several such, or by weathering of the apex. Capillitium simple or freely branched. Basidia long-sterigmate, 4-spored. Spores globose, typically echinulate, rarely smooth.

Capillitium threads attached to the peridium and central columella, when present.
- Peridium dehiscing by weathering of the apex .. *Calvatia.*
- Peridium dehiscing by a definite apical stoma .. *Lycoperdon.*

Capillitium threads free within the peridium.

Threads simple or shortly branched.
- Threads short, smooth .. .. *Disciseda.*
- Threads short, spinose .. .. *Mycenastrum.*

Threads freely branched, of a central main stem, and short, dichotomous acuminate branches.
- Plants with a well developed rooting base .. *Bovistella.*
- Plants at maturity without a definite rooting base .. .. *Bovista.*

MESOPHELLIEAE.

Peridium commonly of 3 layers, indehiscent. Capillitium unbranched. Basidia sterigmate, apparently 2-spored. Spores globose or elliptical, usually with a gelatinous exospore.

Spores globose, reticulated .. .. *Abstoma.*

Spores elliptical, smooth or irregularly roughened.
- Gleba with a central core .. .. *Mesophellia.*
- Gleba without a central core .. .. *Castoreum.*

GEASTREAE.

Peridium 4-layered, dehiscing by an apical pore, or by several such. Capillitium attached, unbranched. Basidia sterigmate, 4 to 8-spored. Spores globose, typically echinulate.

- Peridium dehiscing by a single apical stoma .. .. *Geaster.*
- Peridium dehiscing by many apical stomata .. .. (*Myriostoma*).

IV. SCLERODERMATALES.

Peridium epigaean, sessile or attached by a pseudo-stem, 1 to 3 layered; dehiscing by an apical pore or by irregular fissuring. Gleba at maturity pulverulent (or partially so), without capillitium. Basidia inflated, bearing an irregular number (1 to 12) of spores, sessilely or on short sterigmata. Spores hyaline or coloured, globose or elliptical, smooth or variously sculptured.

SCLERODERMATACEAE.

Peridium of 1 or 2 layers, dehiscing by irregular fissuring or by weathering of the apex, sessile or with a pseudo-stem. Basidia bearing from 1 to 8 spores sessilely or on short sterigmata. Spores globose, echinulate or reticulate.

- Gleba pulverulent at maturity .. .. *Scleroderma.*
- Gleba compacted through gelatinization of tramal plates, forming a cellular tissue containing cavities filled with the pulverulent spore masses .. .. *Pisolithus.*

CALOSTOMATACEAE.

Peridium of 3 layers, dehiscing by an apical stoma, carried upon a prominent pseudo-stem. Gleba borne within a spore sac pendent from the apex of the inner surface of the endoperidium. Basidia bearing sessilely a variable number (5 to 12) of spores which are attached irregularly. Spores globose or elliptical, variously sculptured.

With the characters of the family .. .. *Calostoma.*

V. NIDULARIALES.

Peridium sessile, cupulate, campanulate or depressed globose, 1 to 4 layered, dehiscing by rupture of an epiphragm covering the apex, or by irregular fissuring of the wall. Gleba enclosed in one or many lenticular peridiola, which may be embedded in mucilage, or attached to the peridial wall by funiculi. Capillitium absent. Basidia bearing apically 2, 4, or 8 spores. Spores hyaline, smooth, variously shaped.

NIDULARIACEAE.

Peridium 1 to 3 layered, cupulate or subglobose, dehiscing by rupture of an apical epiphragm, or by fissuring of the wall. Gleba consisting of numerous peridiola embedded in mucilage or attached by funiculi to the wall.

Peridium cupulate, closed with a definite apical epiphragm.
Peridiola attached by funiculi to the peridium wall.
Peridium of 3 distinct layers .. .. *Cyathus.*
Peridium of a single layer .. .. *Crucibulum.*
Peridiola embedded in mucilage, not attached by funiculi .. .. *Nidula.*
Peridium depressed globose, without an epiphragm .. *Nidularia.*

SPHAEROBOLACEAE.

Peridium 3 or 4 layered, depressed globose, dehiscing by stellate rupture of the exoperidium and evagination of the endoperidium. Gleba consisting of a solitary peridiolum free within the peridium.
With the characters of the family .. .. *Sphaerobolus.*

SYSTEMATIC DESCRIPTION OF THE SPECIES OF THE GASTEROMYCETES.

PHALLALES.

Peridium of two or three layers, enclosing the receptacle and gleba, rupturing apically and remaining at the base of the receptacle as the volva. Receptacle of pseudoparenchyma, bearing the gleba on some portion of its surface. Gleba at maturity mucilaginous, olivaceous and usually foetid. Basidia 4 or 8-spored. Spores smooth, usually elliptical.—Cunningham.

PHALLACEAE.

Peridium of three layers, obovate or subglobose, at first submerged, becoming superficial, or almost so; rupturing from the apex downwards to form several lobes, exposing the receptacle and persisting as a volva supporting this structure: gelatinous layer continuous, not broken into plates by intermediate tissue. Receptacle completely free within the volva, stipitate, cylindrical or fusoid, stem hollow, of one or several layers of chambers; bearing the gleba on its modified upper surface, or upon a campanulate pileus attached to its apex. Indusium present in *Dictyophora* and *Clautravia*. Basidia bearing from 4 to 8 sessile, elliptical, smooth spores.—Cunningham.

These comprise the well-known Phalloid Fungi or stink-horns, which are rare with us, the only species recorded being the scarlet *Ithyphallus rubicundus.*

MUTINUS Fr.

(L., *muto*, the male organ of generation.)

Receptacle a hollow, simple, cylindrical or fusiform, coloured stem, closed below, pervious or impervious above; wall chambered, cavities usually opening to the exterior below, to the interior in the glebiferous region. Gleba mucilaginous, olivaceous, foetid, borne up on the apical portion of the receptacle, which may be externally smooth or covered with pseudo-parenchymatous pulvinate or digitate processes. Growing on the ground or on decayed wood.—Cunningham.

[437A. **Mutinus borneensis** Cesati. (Syn., *Jansia rugosa* Penz.) (*Borneensis*, pertaining to Borneo).—Peridium white, obovate, to $\frac{1}{5}$ x $\frac{3}{5}$in. (2 x 1.5 cm.), splitting into 3 to 4 blunt and irregular lobes. Receptacle to $3\frac{1}{4}$ x $1\frac{1}{2}$in. (8 x 3 cm.), fusiform, hollow, acuminate above and below, pervious at the apex, white at the base, becoming salmon-pink at the glebiferous region. Gleba borne on an irregular, fragile, raised network of variable meshes, olivaceous, foetid. Spores elliptical, hyaline, smooth, 3 to 3.5 x 1 to 1.8 μ.—Cunningham. New South Wales—Sydney suburbs, North Dorrigo. Queensland. Victoria. Not yet recorded for South Australia. (Plate VIII. Figure 1.)]

ITHYPHALLUS (Fr.) Fischer.

(Gr., *ithyphallos*, the phallos carried in the festivals of Bacchus.)

Receptacle a hollow cylindrical or fusoid stem bearing an apically attached campanulate pileus, which may be smooth, rugulose or reticulate; apex usually pervious; indusium absent, but an evanescent veil often present. Gleba olivaceous, mucilaginous, usually foetid, covering the exterior of the pileus.—Cunningham.

438. **Ithyphallus rubicundus** (Bosc.) Fischer (L., *rubicundus*, ruddy).—Peridium ovate or subglobose, to $1\frac{1}{5}$in. (3 cm.) diameter, solitary or in small groups of two to six. Receptacle variable in size and shape, fusiform or cylindrical, to 6 x $1\frac{1}{5}$in. (18 x 3 cm.), scarlet, wall several chambers in thickness; pileus conical, slightly rugulose, scarlet, apex perforate. Gleba covering the exterior of the pileus, mucilaginous, foetid, olivaceous. Spores smooth, elliptical, tinted, 3.5 to 5 x 1.5 to 2 μ.—Cunningham. South Australia—Adelaide (in buffalo grass lawn), near Kingston, near Naracoorte. Queensland. New South Wales. Victoria. Tasmania. India. Africa. West Indies. North America. April to June, October.

DICTYOPHORA Desvaux.

(Gr., *dictyon*, a network; *phoreo*, I bear constantly.)

With the characters of *Ithyphallus* and in addition a definite indusium. This is a campanulate, latticed, pseudoparenchymatous pendent membrane, apically attached to the apex of the receptacle beneath the pileus, and basally free, extending to a position midway between volva and pileus.—Cunningham.

Not yet recorded for South Australia.

CLATHRACEAE.

Peridium ovate or subglobose, at first submerged, becoming superficial or almost so; rupturing from the apex downwards to form several lobes, exposing the receptacle and persisting as a volva supporting this structure; gelatinous layer broken into plates by bands of intermediate tissue corresponding with the arms of the receptacle. Receptacle completely free within the volva, of various types, stipitate or sessile, clathrate, columnar, or of apically united, connivent or free arms arising from the apex of the stipitate base, chambered, pseudoparenchymatous. Gleba borne on the arms of the receptacle or upon some modified portion of these. Basidia bearing 4-8, sessile, elliptical, smooth, continuous spores.—Cunningham.

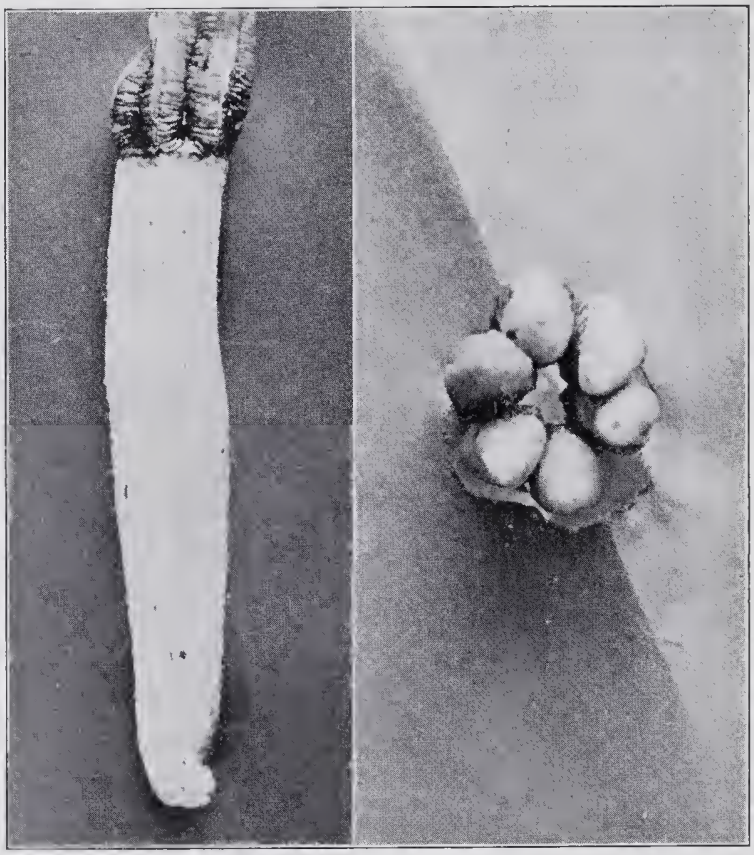
The Lattice Fungus, *Clathrus gracilis*, is not uncommon and the remarkable-looking *Lysurus sulcatus* is occasionally found in buffalo-grass lawns in the early autumn.

ANTHURUS Kalchbrenner.

(Gr., *anthos*, a flower; *oura*, the tail.)

Peridium of three layers, the outer furfuraceous and thin, the middle layer thick and gelatinous. Receptacle a short, cylindrical or flaring hollow stem, bearing apically a variable number (3 to 8) of simple, brittle arms organically united apically (though often breaking free at maturity). Gleba borne on the inner surfaces of the arms, mucilaginous, foetid, olivaceous. Spores tinted or hyaline, continuous, smooth, elliptical. Growing on the ground or on decaying wood—Cunningham.

[438A. **Anthurus Rothae** (Berk. *ex* Fischer) Cunn. (A surname).—Peridium white or greyish, subglobose, ⅜ to ½in. (1.5 to 2 cm.) diameter, externally furfuraceous. Receptacle variable in size, 3 to 5 mm. tall, of 3 or 4 triquetrous or quadrate arms organically united apically, basally contracted to form a short, cylindrical, hollow stem; arms cream-coloured basally, orange or orange-red above, transversely rugulose, hollow, attenuate above and slightly arched outwards. Gleba olivaceous, borne on the inner surfaces of the upper parts of the arms, mucilaginous, foetid. Spores tinted, elliptical, smooth, 3 to 4 x 1.5 to 2 μ.—Cunningham. Queensland. New South Wales—Bulli Pass. (Plate X. Two upper right figures.)]



[*Photos. by S. Tee.*

Figure 61.—*Lysurus sulcatus* (Cke. et Mass.) Cunn. (No. 439). The Grange. Showing also the arms looked at from above.

LYSURUS Fries.

(Gr., *lyo*, I loosen; *oura*, a tail.)

Peridium of three layers, the outer thin and furfuraceous, the middle layer thick and gelatinous. Receptacle a hollow cylindrical stem bearing apically several arms, distinct from the stem, and (usually) free apically. Gleba olivaceous, mucilaginous, foetid, borne on the surfaces of the arms. Spores elliptical, smooth, continuous. Growing on the ground.—Cunningham.

439. **Lysurus sulcatus** (Cke. et Mass.) Cunn. (Syn., *Lysurus australiensis* Cke. et Mass.) (L., *sulcatus*, furrowed).—Peridium subglobose, white, to 2½in. (3 cm.) diameter. Receptacle to 6in. x ¾in. (15 x 2 cm.), stem white below, cream-buff above, cylindrical, or acuminate below, hollow, of 1 to 3 layers of chambers,

divided apically into 5 to 7 arms which are erect, hollow, narrowly lanceolate, $\frac{3}{8}$ to $1\frac{1}{5}$in. (10 to 30 mm.) long, apically attenuate, transversely rugulose, pallid orange and differing in context from the stem. Gleba borne on the inner surface and edges of the arms, sometimes completely surrounding these, brownish, mucilaginous, foetid. Spores elliptical, smooth, hyaline or tinted, 4.5 to 5 x 1.5 to 2 μ.—Cunningham.

The following is a more detailed description of South Australian plants:—Arms 5 to 7, 1in. (2.5 cm.) long, free or occasionally with two arms united above, upright but slightly spreading above, somewhat triangular, narrowing upwards, external surface Light Pinkish Cinnamon (XXIX.), Ochraceous Orange (XV.) or near Amber Brown (III.) and longitudinally grooved, the grooves continuous with the stem, the inner surface covered with the dark brown gleba, more or less transversely rugose, the rugae occasionally anastomosing and encroaching on the sides of the external groove and passing between the arms where the receptacle is represented merely by a narrow rim, the arms hollow with the inner surface folded to correspond with the depressions in the outer surface. Stem cylindrical, occasionally with a trace of polygonal siding in the upper part, attenuated downwards, separated from the arms by a slight sulcus, tapering into the volva, $\frac{1}{3}$in. (8 mm.) thick below, $\frac{1}{2}$in. (12 mm.) thick above, finely furrowed more or less longitudinally leaving somewhat elongated depressions between the furrows, some of these penetrating deeply and forming slightly elongated lacunae, white below, gradually passing into Cream Buff (XXX.) above, hollow with the cavity $\frac{1}{4}$in. (6 mm.) in diameter and narrowed but open above and below, the wall of two layers of cells, the inner the larger, or of 3 to 4 layers. Volva white, lax, torn irregularly into lobes. Smell sickly faecal. Spores 4.5 x 2 μ. South Australia—On a buffalo-grass lawn at the Grange, Millswood, Black Forest, Clarence Park. Queensland. New South Wales. January to April, June. (Figure 61.)

ASEROE La Billardière.

Peridium of three layers, the outer thin and furfuraceous, the middle thick and gelatinous. Receptacle a hollow cylindrical stem bearing apically a horizontal discoid expansion, to the margin of which are attached a variable number of horizontally arranged arms, which may be single or bifurcate. The apex of the stem is often covered with a diaphragm, usually with a small central perforation. Gleba mucilaginous, olivaceous, foetid, imposed upon the upper surface of the disc and proximal portions of the upper surfaces of the arms. Spores smooth, continuous, elliptical. Growing solitary on the ground or on rotting logs.—Cunningham.

[439A. **Aseroe rubra** La Bill. (L., *ruber*, red).—Peridium obovate, to $1\frac{1}{4}$in. (3 cm.) diameter, dingy-white. Receptacle stem cylindrical or flaring hollow, chambered, to $2\frac{1}{2}$ x $\frac{4}{5}$in. (6 x 2 cm.), white and attenuate below, pink and expanding above into a broad horizontal, orbicular disc, to $1\frac{1}{2}$in. (3.5 cm.) diameter, to which the arms are attached laterally. Diaphragm usually well developed, smooth or definitely rugulose, sometimes almost wanting. Arms in 5 to 9 pairs, conniving, to $1\frac{1}{2}$in. (3.5 cm.) long, $\frac{1}{4}$in. (6 mm.) wide near the base, longitudinally grooved basally, rugose on both surfaces but more deeply on the upper, or almost smooth, bifurcate at about $\frac{3}{5}$in. (15 mm.) from the base (sometimes bifurcate only near the apices), subulate towards the tips, which are often twisted. Gleba covering the disc, diaphragm and upper surfaces of the lower portions of the arms, foetid, mucilaginous, olivaceous. Spores tinted, often hyaline, elliptical, smooth, 4 to 5.5 x 1.5 to 2 μ.—Cunningham. Queensland. New South Wales—Sydney suburbs. Victoria. Tasmania. New Zealand. (Plate X. Lower figures.)]

LINDERIA Cunningham.

(After D. H. Linder, an American mycologist.)

Peridium subglobose, of three layers, the outer furfuraceous, the middle one thick and gelatinous. Receptacle of simple columns, organically united apically, but free and tapering basally. Columns chambered, pseudoparenchymatous, smooth or transversely wrinkled, but not winged; bearing on the upper parts of their inner surfaces the mucilaginous olivaceous gleba. Spores elliptical, smooth, continuous.—Cunningham.

No species yet recorded for Australia.

COLUS Cavalier et Sechier.

(L., *colus*, a distaff, a whorl.)

Peridium obovate, smooth externally, of three layers. Receptacle with arms anastomosing apically to support a clathrate dome, below forming several short columns which unite basally to form a hollow flaring tubular stem-like base. Gleba borne on the inner surfaces of the upper portion of the arms, olivaceous, foetid, mucilaginous. Spores smooth, elliptical, continuous. Growing on sandy soil or on dung.—Cunningham.

440. **Colus hirudinosus** Cav. et Sech. (L., *hirudo, hirudinis*, a leech).—Peridium obovate, to 1in. (2.5 cm.) diameter, white or dingy grey externally. Receptacle to 2½in. (6 cm.) tall, apically sparsely clathrate, centrally of 5 to 7 (or more) slender columnar arms united basally into a short cylindrical stem. Arms angled, transversely rugulose, red above, orange below. Gleba olivaceous, borne on the inner surfaces of the arms of the upper portion of the receptacle, foetid. Spores tinted, elliptical, smooth, 5 to 6 x 1.5 to 2.2 μ.—Cunningham.

A more detailed description of specimens from Milson Island, Hawkesbury River, New South Wales, is as follows:—The egg is oval, less than 1in. (2.5 cm.) in size, with a short root, the volva splitting into several short irregular lobes. The receptacle consists of a short broad stem, $\frac{5}{8}$in. long x 7/16in. thick (15 x 12 mm.), slightly rugose and pale orange in colour, expanding into five rugose branches, two of which have a short connecting bar at $\frac{1}{2}$in. (12 mm.) from their commencement and all the branches begin to form large meshes at 1in. (2.5 cm.) distance, the summit being arched over with smaller meshes. The general shape of the scaffolding is pyriform. The branches are rugose, the centres of the outer aspects of the main branches showing apparently a whitish slit, the bases of the branches pale orange, passing into brilliant crimson orange at the meshes. Gleba dark purplish. Smell like that of a nearly dry human faecal stool. South Australia—Adelaide suburbs. New South Wales. Europe. North Africa. March, April, June. (Plate X. Upper left figure.)

CLATHRUS Micheli (*ex* Persoon).

(Gr., *kleithron*, a lattice.)

Peridium globose or obovate, exterior thin and furfuraceous, middle layer thick and gelatinous. Receptacle of several arms organically united to form a hollow latticed sphere; sometimes arms arranged in columnar fashion below, and in extreme forms prolonged into a short cylindrical stem-like base; arms smooth or rugulose, in section elliptical, angled or rounded, cellular or tubular. Gleba borne on the inner surfaces of the arms, mucilaginous, olivaceous, foetid. Spores elliptical, smooth. On the ground or on decaying wood.—Cunningham.

441. **Clathrus cibarius** (Tulasne) Fischer (L., *cibarius*, pertaining to victuals).—Peridium obovate or subglobose, dingy white, to 2¾in. (7 cm.) diameter. Receptacle sessile, white, subglobose or commonly obovate, to 6 x 4in. (15 x 10 cm.), composed of numerous obliquely anastomosing arms, which are transversely rugulose, in section elliptical, tubular or more often coarsely cellular, not or scarcely thickened at the interstices (though in some forms attaining a thickness twice that of the arms). Gleba covering the inner surfaces of the arms, olivaceous, mucilaginous, foetid. Spores tinted, elliptical, smooth, 4 to 6 x 1.8 to 2.5 μ.—Cunningham. South Australia—Blackwood. New South Wales. New Zealand. July.

442. **Clathrus gracilis** (Berk.) Schlecht. (L., *gracilis*, slender).—Receptacle white, sessile, variable in size and shape, 1½ to 8in. (4 to 20 cm.) diameter, arms smooth, often longitudinally sulcate externally, in section flattened, to 5 mm. thick, tubular, or with two or more tubes welded, expanded at the interstices. Gleba borne on the inner surfaces of the arms, olivaceous, foetid, mucilaginous. Spores hyaline or tinted, elliptical, smooth, 4.5 to 6 x 1.8 to 2.5 μ.—Cunningham. South Australia—Adelaide, Salisbury, Greenhill Road, Mount Lofty, Baker's Gully near Clarendon, Willunga Hill, Barossa Range, Charleston, Mangalo, Kinchina, Encounter Bay, Monash, Kalangadoo (S.E.). New South Wales. Victoria. Tasmania. Western Australia. May to September.

443. **Clathrus pusillus** Berk. (L., *pusillus*, small).—Peridium ovate, to $\frac{4}{5}$in. (20 mm.) diameter. Receptacle red, obovate, to 1⅗in. (4 cm.) diameter, clathrate, arms somewhat columnar below, sometimes united into a stem-like base, or in

[*Watercolours by Miss P. Clarke.*

PLATE X.

Upper left—*Colus hirudinosus* Cav. et Sech. (No. 440). Milson Island, Hawkesbury River, New South Wales.

Two Upper Right—*Anthurus Rothae* (Berk. ex Fischer) Cunn. (No. 438A). Bulli Pass, New South Wales.

Lower—*Aseroe rubra* LaBillard. (No. 439A). Sydney.

certain forms clathrate above and below, columnar equatorially; arms transversely rugulose, exteriorly longitudinally sulcate, tubular. Gleba borne on the inner surfaces of the arms, foetid, olivaceous, mucilaginous. Spores hyaline or tinted, elliptical, smooth, 4.6 to 5.5 x 1.5 to 2.2 μ.—Cunningham.

This beautiful small red species, known from Queensland, New South Wales, Victoria, and Western Australia, has not yet been recorded for South Australia.

CLAUSTULACEAE Cunningham.

Peridium of two layers, the inner layer thick, gelatinous and forming a continuous layer, peridial plates being absent. Receptacle a hollow, indehiscent sphere, wall chambered and pseudoparenchymatous. Gleba covering the interior of the receptacle wall, confined to a single layer of glebal chambers, mucilaginous matrix wanting. Spores continuous, smooth, elliptical.—Cunningham.

CLAUSTULA Curtis.

(L., *clausus*, shut.)

Peridium of two layers, the outer thin and furfuraceous, the inner thick, gelatinous and without peridial planes. Receptacle obovate or subglobose, hollow, indehiscent; wall chambered, pseudoparenchymatous; gleba forming a thin layer over the inner wall of the receptacle, non-mucilaginous and without the characteristic odour of the other members of the order.—Cunningham.

This New Zealand genus has not been recorded for Australia.

HYMENOGASTRALES.

Peridium indehiscent, of one to three layers, or occasionally wanting at maturity, sessile or stipitate, epigaean or hypogaean. Stem when present traversing the gleba as a columella, and attached apically to the peridium. Gleba persisting at maturity, composed of numerous tramal plates anastomosed to enclose numerous labyrinthiform or subglobose cavities; capillitium absent. Basidia one to eight-spored.—Cunningham.

HYMENOGASTRACEAE (including HYSTERANGIACEAE).

Plants tuberiform, subglobose or pyriform, without a stem, but attached to the substratum by lateral or basal rhizomorphs; hypogaean or epigaean. Peridium of one to three layers, of stupose or pseudoparenchymatous hyphae, indehiscent. Gleba in several genera traversed by a simple or branched columella arising usually from a sterile base. Spores globose or elliptical, coloured or hyaline, smooth or variously sculptured.—Cunningham.

The members of this family are more or less globose in shape, small (from the size of a split pea to a large marble), without an external stem though sometimes traversed by a central columella and with numerous small chambers often submicroscopic in size. They are usually found partly emerged from the ground or under vegetable debris and disintegrate when past maturity without resolving into a dust-like mass of spores as in the puff-balls. Australia is relatively unusually rich in species.

Section I.—Peridium with lateral rhizomorphs; gleba without a columella; spores elliptical and smooth.

RHIZOPOGON Fries et Nordholm.

(Gr., *rhiza*, root; *pōgōn*, a beard.)

Plants subglobose or tuberiform, without a definite sterile base, epigaean or hypogaean. Peridium tough and membranous, of stupose and sometimes gelatinized hyphae arranged in one or two layers; exteriorly covered with many or few adherent, anastomosing, dark-coloured fibrils which are united below to form mycelial strands or rhizomorphs. Gleba of permanent tramal plates anastomosed to enclose subglobose or labyrinthiform cavities. Spores hyaline or tinted, smooth, elliptical or less commonly obovate. Basidia subclavate or cylindrical, usually soon collapsing, bearing from two to eight spores on short sterigmata. —Cunningham.

KEY TO THE SPECIES.

Peridium of two distinct layers, spores obovate .. .. 444. *Rhizopogon Clelandi.*
Peridium of a single layer; spores elliptical.
Gleba strongly gelatinized and indurated .. .. 445. *R. luteolus.*
Gleba fleshy, firm, though soft .. .. 446. *R. rubescens.*

444. **Rhizopogon Clelandi** Cunn. (Named after the finder of the type).—Plants subglobose, to 1½in. (3.5 cm.) diameter, pallid cream colour, drying lemon yellow or tawny brown. Peridium of two layers, the outer of partly gelatinized hyphae and peeling away in shreds, exposing the inner portion which likewise is of partly gelatinized hyphae but more firmly compacted, 400 to 800 μ thick. Fibrils few, adnate, absent above, rhizoid-like below, sometimes wanting. Gleba cream-coloured, becoming tawny, fleshy, not at all indurated; cells subglobose, empty of spores; tramal plates 70 to 100 μ thick, scissile, of woven hyphae, not at all gelatinized. Spores hyaline, obovate or less commonly subglobose, shortly pedicellate, smooth, 7 to 8.5 x 4.5 to 6 μ (rarely to 10 μ long). Basidia persistent, 2 to 4-spored. Half buried in the ground.—Cunningham. South Australia—Second Valley Forest Reserve. June.

445. **Rhizopogon luteolus** Fr. et Nordh. (L., *luteolus*, yellowish).—Plants subglobose, oblong or tuberiform, to 1¾in. (3 cm.) diameter, bay brown or tawny brown, often distinctly yellowish. Fibrils well developed, dark-brown or black, appressed, rhizoid-like basally. Peridium of strongly gelatinized woven hyphae, 250 to 350 μ thick, ochraceous or tawny in section. Gleba firm and indurated, at first white, becoming yellowish-brown, finally almost black in areas; cavities labyrinthiform, filled with spores; tramal plates 70 to 90 μ thick, strongly scissile, of gelatinized hyphae. Spores tinted yellow, elliptical or occasionally irregular, 6 to 9 x 2.8 to 3.5 μ, sometimes shortly pedicellate. Basidia subclavate, bearing 6 to 8 spores. Growing partly buried in sandy soils under pines.—Cunningham. South Australia—Mount Lofty, Kuitpo, Kalangadoo. New South Wales. Tasmania. New Zealand. Europe. Asia. Africa. North America. April to June, August.

446. **Rhizopogon rubescens** Tul. (L., *rubescens*, turning red).—Plants gregarious, sometimes caespitose, irregularly globose or tuberiform, to 2½in. (6 cm.) diameter, at first white, then lemon yellow, drying bay brown or ferruginous brown, often with a reddish tint, and tinted red where bruised or cut. Fibrils usually scanty above, more prominent below, though not infrequently almost wanting, appressed, dark-brown or black. Peridium of a single layer of loosely woven but firm hyphae, 150 to 300 μ thick, tawny or yellowish brown in section, mixed with numerous amorphous globules of orange pigment. Gleba from tawny to dark ferruginous brown, firm but soft and readily cut, cells subglobose, empty of spores; tramal plates 35 to 60 μ thick, rarely more, slightly scissile, of loosely woven hyphae not at all gelatinized. Spores smooth, tinted, elongate elliptical, ends rounded, 6 to 9 x 2.8 to 3.5 μ. Basidia cylindrical, 6 to 8-spored. Growing on the surface or partially buried in debris on the ground under *Pinus* species.—Cunningham. South Australia—Millbrook, Willunga Hill (no pines near), Mount Lofty. New South Wales. Tasmania. Western Australia. New Zealand. Europe. Asia. Africa. North and South America. May to July, October, December.

MELANOGASTER Corda.

(Gr., *melas*, black; *gastēr*, the belly.)

Plants subglobose or irregularly tuberiform, with branched fibrils arising from the exterior of the peridium, more numerous basally, hypogaean. Peridium of a single tough layer of woven gelatinized hyphae, continuous with the tramal plates. Gleba consisting of tramal plates anastomosed to form numerous polygonal or subglobose cavities, which are usually larger towards the centre and at maturity filled with spores; hymenium of clavate 2 to 8-spored basidia (commonly 2 to 4) which are not arranged in a definite palisade but irregularly distributed through a broad hyphal zone lining the cavities. Spores borne on short sterigmata, elliptical or lemon-shaped, deeply coloured, smooth, shortly pedicellate. —Cunningham.

M. ambiguus (Vittad.) Tulasne has been recorded for New Zealand but the genus has not yet been found in Australia.

[Peridium with lateral rhizomorphs. Spores globose. This genus *Sclerogaster* has not yet been recorded for Australia or New Zealand.]

SECTION II.—Peridium with a radicate base; without a columella; spores elliptical, smooth or variously sculptured.

HYMENOGASTER Vittadini.

(Gr., *hymēn*, a membrane; *gastēr*, the belly.)

Plants subglobose, pyriform or occasionally tuberiform, attached to the substratum by a radicate base or strands, lateral rhizomorphs being absent. Peridium of one or two layers, composed of stupose or pseudoparenchymatous hyphae. Gleba of tramal plates anastomosed to enclose numerous subglobose cavities lined with the palisade hymenium; columella absent. Spores elliptical, coloured, smooth or more often covered with a firm, wrinkled or otherwise roughened gelatinous membrane; basidia persistent, cylindrical, bearing 2 to 4 spores on short stout sterigmata. Growing superficially or partially submerged in soils rich in vegetable debris.—Cunningham.

KEY TO THE SPECIES.

Spores perfectly smooth.
- Spores 7 to 10 μ long .. .. 447. *Hymenogaster Maideni.*
- Spores 13 to 16 μ long.
  - Peridium reddish brown .. .. *H. tasmanicus.*
  - Peridium golden yellow .. .. *H. aureus.*
- Spores 18 to 22 μ long .. .. *H. fusisporus.*

Spores covered with a fine membrane which in mature plants is rugulose-areolate or verrucose.
- Peridium of two distinct layers .. .. 448. *H. luteus.*
- Peridium of a single layer.
  - Spores 12 to 16 μ long.
    - Spores elliptical, 4 on each basidium .. *H. nanus.*
    - Spores fusiform, 2 on each basidium .. *H. albellus.*
  - Spores 16 to 22 μ long .. .. *H. zeylanicus.*

Spores with strongly reticulated membrane.
- Endospore markedly thickened .. .. *H. macrosporus*
- Endospore thin .. .. 449. *H. reticulatus,*

447. **Hymenogaster Maideni** Rodw. (In honour of J. H. Maiden, F.R.S., for many years Director of the Botanic Gardens, Sydney). Plants irregularly globose or oblong, to 1¾in. (4 cm.) diameter, dull white, becoming dingy brown when dried. Peridium 50 to 200 μ thick, of closely woven gelatinized hyphae, hyaline. Gleba pallid buff or pallid cinnamon brown, cells empty, subglobose, 1 to 2 mm.; tramal plates 50 to 100 μ thick, of densely woven gelatinized hyphae; basidia 4-spored. Spores broadly elliptical or slightly obovate, pallid ferruginous, 7 to 10 x 4.5 to 6 μ, perfectly smooth, shortly pedicellate.—Cunningham. South Australia—Encounter Bay, Upper Tunkalilla Creek, Second Valley Forest Reserve, Stirling West. Tasmania. May, June, July.

448. **Hymenogaster luteus** (Mass.) Cunn. (L., *luteus*, pale yellow like the yolk of an egg)—Plants irregularly globose, subglobose or pyriform, to 2¼in. (3 cm.) diameter, yellowish ochre to ochraceous tawny when fresh, and viscid. Peridium 250 to 300 μ thick, of two definite layers, an inner coloured one of pseudoparenchyma, and an outer layer arising from this, of loose hyphae arranged radially and embedded in a thick gelatinous matrix. Gleba dark umber brown, firm, cells subglobose, 1 to 2 in 1 mm., empty; tramal plates 50 to 150 μ thick, of woven hyphae strongly gelatinized, scissile, tinted, frequently with a small dome-like base; basidia 2 to 4-spored. Spores broadly elliptical or slightly obovate, golden brown, 11 to 15 x 9 to 11 μ, shortly pedicellate, covered with a gelatinous tunic which is 2.5 μ thick and markedly areolate.—Cunningham. South Australia—Mount Lofty, Stirling West, National Park. New South Wales. Tasmania. New Zealand. June, July.

449. **Hymenogaster reticulatus** Cunn. (L., *reticulatus*, reticulated).—Plants subglobose, to over ½in. (15 mm.) diameter, bright ochraceous or yellowish brown. Peridium 120 to 300 μ thick, of densely woven hyphae which exteriorly are more loosely arranged, not gelatinized. Gleba ferruginous, cells subglobose, minute, 5 to 6 mm., empty; tramal plates 50 to 80 μ thick, of woven, strongly gelatinized hyphae, scissile at the gussets; basidia apparently 2-spored. Spores fusiform, both ends acuminate, or spindle-shaped, clear fuscous brown, 18 to 22 x 11 to 15 μ (including spindle and reticulations), strongly and coarsely reticulated, wings to 3 μ tall, endospore 1 μ thick.—Cunningham. South Australia—National Park. Tasmania. April.

Hymenogaster tasmanicus Cunn. (Tasmania); *H. aureus* Rodw. (Tasmania); *H. fusisporus* (Massee et Rodw.) Cunn. (Tasmania); *H. nanus* Mass. et Rodw. (Tasmania); *H. albellus* Mass. et Rodw. (Tasm., N.S.W.); *H. zeylandicus* Petch (Ceylon and N.Z.); and *H. macrosporus* Cunn. (Tasm.) have not yet been recorded from South Australia.

SECTION III.—Peridium with radicate strands, without a columella; spores globose, commonly sculptured, rarely smooth.

OCTAVIANIA Vittadini.

(After Dr. Vincent Ottaviani.)

Plants subglobose or pyriform, attached by radicate strands. Peridium simple, rarely of two layers, sometimes scanty and in rare cases wanting at maturity, of woven partly gelatinized hyphae, or pseudoparenchymatous. Gleba of permanent tramal plates anastomosed to enclose cellular or labyrinthiform cavities lined with a permanent palisade hymenium: columella absent; sterile base present or absent. Spores hyaline or less frequently coloured, globose, echinulate, verrucose, reticulated, or rarely smooth; basidia subclavate or cylindrical, bearing 2 to 4 spores on short but stout sterigmata. Growing partially buried in soils rich in vegetable débris.—Cunningham.

KEY TO THE SPECIES.

Spores perfectly smooth.
- Spore wall to 4 μ thick .. .. *Octaviania Clelandi.*
- Spore wall 0.5 to 1 μ thick .. .. *O. levispora.*

Spores covered with coarse or fine echinulations, or finger-like processes.
- Spines appearing as finger-like processes.
  - Spores 10 to 12 μ .. .. 453. *O. pallida.*
  - Spores 12 to 16 μ .. .. *O. seminuda.*
- Spines appearing as coarse or fine echinulations.
  - Spines minute, 0.5 μ or less .. .. 450. *O. australiensis.*
  - Spines coarse, 2 to 3 μ long.
    - Spores hyaline .. .. *O. flava.*
    - Spores coloured.
      - Spores 9 to 12 μ .. .. *O. Hinsbyi.*
      - Spores 14 to 18 μ or more .. .. .. *O. tasmanica.*

Spores reticulated.
- Spores 6 to 10 μ and hyaline.
  - Reticulations vaguely defined .. .. 451. *O. glabra.*
  - Reticulations sharply defined .. .. 452. *O. brisbanensis.*
  - Reticulations in the form of striae .. .. .. 454. *O. striata.*
- Spores 16 to 22 μ, coloured .. .. *O. densa.*

450. **Octaviania australiensis** Cke. (Pertaining to Australia).—Plants subglobose, ½ to 1in. (1 to 2.5 cm.) diameter, smooth, cream-coloured becoming brown. Peridium 100 to 150 μ thick, of woven non-gelatinized hyphae. Gleba cream-coloured or ochraceous, cells subglobose or labyrinthiform, small, empty, larger towards the centre; sterile base present or absent; tramal plates 35 to 60 μ thick, of woven non-gelatinized hyphae, scissile; basidia chiefly 2-spored. Spores globose, subglobose or even shortly elliptical, 8 to 10 x 6 to 9 μ, tinted ferruginous, shortly pedicellate, covered with fine, moderately closely arranged

echinulations, which are about 0.5 μ long, epispore about 1 μ thick.—Cunningham. South Australia—Mount Lofty. Victoria. New South Wales. April, June, July.

451. **Octaviania glabra** (Rodw.) Cunn. (L., *glaber*, smooth).—Plants irregularly globose, subglobose or subturbinate, $\frac{3}{5}$ to 1in. (15 to 25 mm.) diameter, exteriorly ochraceous or cinnamon brown, smooth, firm, and much wrinkled. Peridium 80 to 125 μ thick, of woven gelatinized hyphae. Gleba ochraceous or pallid cream-coloured, cells empty, subglobose, somewhat tortuous, 2 to 3 to 1 mm.; tramal plates 50 to 70 μ thick, of gelatinized woven hyphae, scissile; sterile base present or absent; basidia 4-spored. Spores globose or subglobose, 6 to 8.5 μ (including reticulations), hyaline, finely but obscurely reticulated, reticulations appearing as vague irregular broken lines, about 0.5 μ tall.—Cunningham. South Australia—Mount Lofty, National Park, Willunga Hill, Mount Compass, Encounter Bay, Second Valley Forest Reserve. Tasmania. April, May, June, August.

452. **Octaviania brisbanensis** (Berk. et Br.) Cunn. (*Brisbanensis*, belonging to Brisbane).—Plants subglobose or irregular, $\frac{1}{5}$ to 1in. (5 to 25 mm.) diameter, pallid ochraceous, tawny or often reddish-brown, smooth, but much wrinkled when dried. Peridium 80 to 120 μ thick, composed of hyaline, loosely woven, partly gelatinized hyphae, darker in colour peripherally, sometimes with lactiferous ducts. Gleba pallid cream colour, yellowish or ochraceous, cells empty, subglobose or slightly labyrinthiform, 3 or 4 to 1 mm.; sometimes with a distinct sterile base; tramal plates 50 to 100 μ thick, of woven non-gelatinized hyphae; scissile at the gussets, sometimes lactiferous; basidia 2 or 4-spored. Spores hyaline, globose, 6.5 to 8 μ in diameter (including reticulations), definitely and plainly reticulated, wings about 0.75 to 1 μ tall.—Cunningham. South Australia—Mount Lofty, Stirling West, Belair, Tweedvale, Warren Reservoir. Queensland. New South Wales. Tasmania. May, June, July, October.

453. **Octaviania pallida** (Mass. et Rodw.) Cunn. (L., *pallidus*, pallid).—Plants subglobose, white, becoming ochraceous, $\frac{1}{2}$ to $1\frac{1}{4}$in. (1.2 to 3 cm.) diameter. Peridium 75 to 150 μ thick, sometimes almost wanting, of partly gelatinized, sometimes pseudoparenchymatous, woven hyphae, tinted. Gleba white, becoming ochraceous, cells subglobose, 1 to 2 to 1 mm., empty of spores; sterile base absent; tramal plates 80 to 100 μ thick, pseudoparenchymatous, scissile, especially at the gussets; basidia 4-spored. Spores globose, hyaline, 10 to 12 μ diameter (including spines), shortly pedicellate, covered with densely packed, hyaline, finger-like processes which attain a length of 3 μ.—Cunningham. South Australia—National Park, Mount Lofty. Tasmania. June.

454. **Octaviania striata** Cunn. (L., *striatus*, striated).—Plants irregularly globose or pyriform, $\frac{3}{5}$ to 1in. (15 to 25 mm.) diameter, exteriorly reddish-brown and dull, smooth but wrinkled when dry. Peridium compact, 60 to 110 μ thick, of strongly gelatinized, densely woven hyphae. Gleba ochraceous when dry, firm, cells somewhat elliptical or slightly labyrinthiform, empty, variable in size, 2 to 4 to 1 mm., larger below; sterile base present or absent; tramal plates 65 to 75 μ thick, of densely woven gelatinized hyphae, firm, not scissile; basidia 4-spored. Spores globose, hyaline, 8 to 10 μ (including reticulations), shortly pedicellate, strongly reticulated, wings to 1.5 μ tall, arranged in the form of striae.—Cunningham. South Australia—Mount Lofty. New South Wales. May, June.

Octaviania levispora Rodw. (Tasm.); *O. Clelandi* (Rodw.) Cunn. (Tasm.); *O. Hinsbyi* (Rodw.) Cunn. (Tasm.); *O. seminuda* (Massee et Rodw.) Cunn. (Tasm.); *O. flava* (Rodw.) Cunn. (Tasm.); *O. tasmanica* (Kalchb.) Cunn. (Tasm., N.Z.); and *O. densa* (Rodw.) Cunn. (Tasm.)—have not yet been recorded for South Australia.

SECTION IV.—Peridium with radicate strands, traversed by a definite dendroid columella; spores globose, verrucose.

HYDNANGIUM Wallroth. (Syn. ARCANGELIELLA Cav.)

(Gr., *hydnon*, a truffle; *angeion*, a vessel.)

Plants subglobose or pyriform, attached by radicate strands. Peridium simple, often reduced, of woven gelatinized hyphae. Gleba of permanent tramal plates anastomosed to enclose labyrinthiform cavities, lined with a permanent palisade

hymenium; columella dendroid, arising from a well defined sterile base. Spores globose, echinulate, pallid coloured; basidia subclavate, bearing from 1 to 4, but commonly 2 spores.—Cunningham.

455. **Hydnangium carneum** Wallr. (L., *carneus*, flesh-coloured).—Plants subglobose, ½ to 1in. (1.2 to 2.5 cm.) diameter, often with a small rooting base, pallid cream or ochraceous. Peridium fragile and readily disappearing, 50 to 200 μ thick, variable in different plants from the same collection, of woven but not gelatinized hyphae. Gleba ochraceous when dry, of large labyrinthiform cavities, which tend to a radial arrangement from the base, smaller and more compacted below; sterile base and dendroid columella present; tramal plates 25 to 100 μ thick, of woven, non-gelatinized hyphae; basidia commonly 2-spored; cystidia sometimes present. Spores globose, 14 to 18 μ in diameter (including spines), ferruginous or with a tinted spore wall only, covered with coarse echinulate spines, 2 to 2.5 μ long, broad at the base, regular, hyaline; epispore 1.5 to 2 μ thick, tinted yellow and highly refractive.—Cunningham. South Australia—Mount Lofty, Morialta, Kuitpo. New South Wales. Tasmania. New Zealand. Europe. July, August.

[Peridium with a radicate base; usually without an evident columella; spores globose with a conspicuous gelatinous exospore enveloping the surface sculpturing. —The genus *Leucogaster* has not been recorded from Australia or New Zealand.]

Section V.—Peridium with radicate strands; gleba traversed by a definite columella; spores elliptical, coloured and with a gelatinous exospore which is rugulose or rugulose-areolate.

DENDROGASTER Bucholtz.

(Gr., *dendron*, a tree; *gastēr*, the belly.)

Plants subglobose or pyriform, attached by a radicate basal strand. Peridium of one or two layers, pseudoparenchymatous. Gleba of pseudoparenchymatous tramal plates anastomosed to enclose numerous cavities lined with a definite hymenial layer; traversed by a simple or branched dendroid columella, which may be reduced to a sterile base with a few radiating bands. Spores elliptical, coloured, with a rugulose epispore; basidia persistent, bearing 2 to 4 spores on short sterigmata. Epigaean, or partly submerged in soils rich in humus. —Cunningham.

KEY TO THE SPECIES.

Peridium of two distinct layers .. .. 456. *Dendrogaster piriformis.*

Peridium of a single layer.

Peridium ferruginous brown .. .. 457. *D. fulvus.*

Peridium violaceus .. .. *D. violaceus.*

456. **Dendrogaster piriformis** Cunn. (L., *piriformis*, pear-shaped).—Plants pyriform or sub-turbinate, to ⅜in. (15 mm.) tall, smooth, reddish brown. Peridium double, 200 to 250 μ, exterior layer of pseudoparenchyma, interior layer of brown partly gelatinized, parallel hyphae. Gleba reddish brown or ferruginous, cells subglobose, 1 or 2 to 1 mm., with a sterile base and traversed by a pallid yellow dendroid percurrent columella; tramal plates 90 to 110 μ thick, pseudoparenchymatous; basidia 4-spored. Spores obovate, chestnut brown, 12 to 14 x 6.5 to 8 μ, shortly pedicellate, distinctly areolate, wall 1.5 μ thick.—Cunningham. South Australia—Encounter Bay, National Park. June, August.

457. **Dendrogaster fulvus** (Rodw.) Cunn. (L., *fulvus*, tawny).—Plants irregularly globose, to 1½in. (3.5 cm.) diameter, knobbed or wrinkled, pallid, becoming dingy brown when dried. Peridium 150 to 200 μ thick, of a single layer of hyaline pseudoparenchyma, hyphae of the exterior arranged in a parallel manner. Gleba dark ferruginous brown, cells subglobose, 1 to 2 to 1 mm., empty; traversed by a sparingly branched columella arising from a poorly defined sterile base; tramal plates 75 to 120 μ thick, pseudoparenchymatous, not scissile; basidia 4-spored. Spores elliptical or elliptical-oblong, ferruginous, 8.5 to 10 x 6 to 8 μ, covered with a delicate, coloured, gelatinous membrane, which is distinctly rugulose-areolate.—Cunningham. South Australia—Mounty Lofty, Greenhill Road. Tasmania. June to August.

D. violaceus (Mass. et Rodw.) Cunn., found in Tasmania and Victoria, has not been recorded for South Australia.

Section VI.—Peridium with a radicate strand; gleba traversed with a definite dendroid columella; spores elliptical, smooth, hyaline or tinted only.

HYSTERANGIUM Vittadini.

(Gr., *hystera*, the womb; *angeion*, a vessel.)

Plants subglobose, pyriform or tuberiform, attached by radicate strands. Peridium of one or two layers, of woven or pseudoparenchymatous hyphae, usually partly gelatinized and sometimes separating readily from the gleba. Gleba of numerous, usually gelatinized, tramal plates, anastomosed to enclose numerous cavities lined by a hymenium of cylindrical basidia, bearing 2 to 8 spores on short sterigmata; penetrated by a definite simple or branched columella arising from a discoid sterile base. Spores smooth (or in a few cases covered with a gelatinous tunic), tinted or hyaline, elliptical or elliptic-fusiform.—Cunningham.

KEY TO THE SPECIES.

Spores 2 to 3 μ long .. .. *Hysterangium lobatum.*
Spores to 6 μ long .. .. *H. hautu.*
Spores over 8 μ in length.
  Spores with a conspicuous gelatinous tunic.
    Gleba sage-green, cells minute, tramal plates 15 to 50 μ thick .. .. 458. *H. inflatum.*
    Gleba olivaceous, cells large, tramal plates 80 to 200 μ thick .. .. *H. tunicatum.*
  Spores without a gelatinous exospore.
    Gleba olivaceous or sage green.
      Spores bluntly elliptical, ends bluntly rounded .. .. *H. sclerodermum.*
      Spores narrowly fusiform, ends acuminate .. .. 459. *H. affine.*
    Gleba ferruginous or umber brown.
      Plants minute, 2 to 3 mm. in diameter *H. pumilum.*
      Plants 2 to 3 cm. in diameter .. .. .. *H. neglectum.*

458. **Hysterangium inflatum** Rodw. (L., *inflatus*, puffed up, inflated).—Plants subglobose or shortly pyriform, to $\frac{3}{5}$in. (1.5 cm.) diameter, reddish brown, drying dingy brown. Peridium 200 to 300 μ thick, of two layers, the outer a shallow zone of woven hyphae arranged in a parallel manner, seated upon an inner layer of pseudoparenchyma. Gleba greenish, firm, cells elongate, arranged in a radial manner, filled with spores; tramal plates 15 to 50 μ thick, of densely woven strongly gelatinized hyphae; columella branched, sterile base present; basidia 6-spored. Spores elliptic-obovate, smooth, tinted, 9 to 11 x 3.5 to 4.5 μ, covered with a gelatinous exospore which is much inflated laterally but free from the rounded apex, base shortly pedicellate.—Cunningham. South Australia—Mount Lofty, National Park, Kuitpo, Encounter Bay. New South Wales. Tasmania. North America. May, June, July.

459. **Hysterangium affine** Mass. et Rodw. (L., *affinis*, neighbouring, related).—Plants subglobose or pyriform, $\frac{1}{3}$ to $\frac{3}{5}$in. (8 to 16 mm.) diameter, at first white, drying dingy ochre, attached by several scanty basal strands. Peridium 380 to 450 μ thick, of apparently two layers, the outer pseudoparenchymatous and coloured peripherally, the inner layer of gleba tissue upwards of 200 μ thick. Gleba dark olive green or sage green, firm and compact, cavities elongate, radiate, minute, partly filled with spores; columella dendroid, arising from a sterile base; tramal plates 30 to 100 μ thick, of gelatinized hyphae; basidia 6-spored. Spores elliptic-obovate, smooth, tinted or hyaline, 9 to 12 x 3 to 8.5 μ (sometimes to 14 μ in length), shortly pedicellate.—Cunningham. South Australia—Mount Lofty. Tasmania. June.

Hysterangium lobatum Cunn. (N.Z.); *H. hautu* Cunn. (N.Z.); *H. sclerodermum* (Cooke) Cunn. (Tasm., N.Z.); *H. neglectum* Mass. et Rodw. (Tasm., Nth. America); *H. pumilum* Rodw. (Tasm.); and *H. tunicatum* Cunn. (N.Z.), have not yet been recorded for South Australia.

Section VII.—Peridium with a radicate strand; gleba traversed by a definite dendroid columella; spores elliptical, coloured, longitudinally ribbed.

GAUTIERIA Vittadini.

(After Joseph Gautieri.)

Plants subglobose, pyriform, or tuberiform, with radicate mycelial strands. Peridium either fragile and in mature plants wanting, or more frequently well developed and permanent, of one or two layers. Gleba of tramal plates anastomosed to form labyrinthiform or cellular cavities lined with a definite palisade hymenium; columella simple or more often dendroid, traversing the gleba; sterile base usually present. Spores coloured, elliptical or obovate, longitudinally ribbed; basidia 1 to 4-spored, borne on definite sterigmata. Growing superficially or partly submerged in vegetable débris.—Cunningham.

KEY TO THE SPECIES.

Spores upwards of 20 μ in length.
- Spores fusiform, apex markedly acuminate .. .. *Gautieria albida.*
- Spores broadly elliptical, apex rounded or bluntly pointed .. .. 460. *G. macrospora.*

Spores to 16 μ in length.
- Peridium of pseudoparenchyma.
  - Spores with 4 to 5 longitudinal ribs .. .. *G. novaezelandiae.*
  - Spores with 8 to 10 longitudinal ribs .. .. *G. tasmanica.*
- Peridium of woven hyphae, not pseudoparenchymatous.
  - Spores with 8 to 11 longitudinal ribs .. .. *G. costata.*
  - Spores with about 16 longitudinal ribs .. .. *G. Rodwayi.*

460. **Gautieria macrospora** Cunn. (Gr., *makros*, long; *spora*, seed).—Plants subglobose or somewhat irregular, ½ to 1in. (10 to 25 mm.) diameter, pallid white with a tinge of bluish green, becoming ochraceous when dried. Peridium 150 to 200 μ thick, of a single layer of pseudoparenchyma and a prominent layer of crystals lying next the gleba. Gleba umber brown, cells minute, 2 to 3 to 1 mm., filled with spores, appearing compact; traversed by a branched columella arising from a scanty sterile base; tramal plates 30 to 80 μ thick, of woven gelatinized hyphae, basidia 2-spored. Spores broadly elliptical or broadly fusiform, 20 to 27 x 11 to 14 μ, ferruginous, apex acuminate, base shortly pedicellate, ribs about 8 to 10, acute, to 2.5 μ tall, vaguely anastomosed. —Cunningham. South Australia—Mount Lofty. July.

Gautieria novaezelandiae Cunn. (N.Z.); *G. tasmanica* Cunn. (Tasmania); *G. costata* Cunn. (N.S.W.); *G. Rodwayi* (Massee) Zeller et Dodge (N.S.W., Tasm.); and *G. albida* (Massee et Rodw.) Cunn. (Tasm.) have not yet been recorded for South Australia.

SECOTIACEAE.

Plants stipitate, epigaean at maturity. Peridium of 1 or 2 layers, indehiscent. Stipe traversing the gleba, and attached to the peridium at the apex. Gleba of numerous plates anastomosed to enclose cellular or labyrinthiform cavities; capillitium absent. Basidia commonly sub-clavate, forming a palisade lining the glebal cavities, commonly tetrasporous. Spores sterigmate, variously shaped, rough or smooth.—Cunningham.

SECOTIUM Kunze.

(Gr., *sēkos*, a pen or enclosure, in reference to the fruiting body.)

Peridium variously shaped, of a single pseudoparenchymatous layer, often brightly coloured, indehiscent; carried on a well developed stipe, which is central, long or attenuated, hollow, stuffed or solid, traversing the gleba and merging

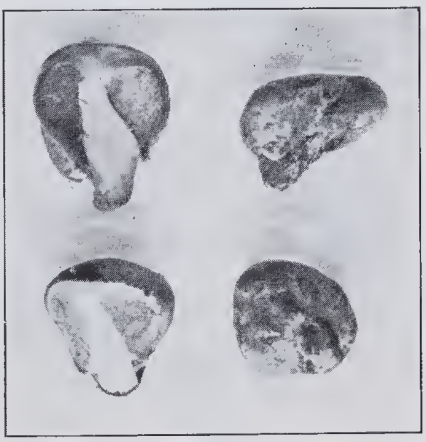
apically with the peridium. Gleba of numerous plates anastomosed to form cellular or labyrinthiform cavities, appearing lamellar in a few species; attached above to the stem, but free below; cystidia present or absent. Spores subglobose, elliptical, obovate or spindle-shaped, hyaline or coloured, echinulate or smooth. Solitary or in small groups on decaying humus or rotting wood buried in the substratum.—Cunningham.

The species of *Secotium* sometimes resemble small deformed agarics with the gills anastomosing to form cavities and a veil which ruptures to expose the lowermost chambers. The stem is carried upwards to the apex of the peridium and in the South Australian species the external part is usually short. Our species are, for the most part, soberly coloured. *Secotium coarctatum* is strongly fragrant and may be found on clay soil on the foothills near Adelaide.

KEY TO THE SPECIES.

Spores smooth; peridium scabrid, hispid or tomentose.
- Gleba ochraceous or ferruginous.
  - Spores elliptical, over 10 μ long .. .. 461. *Secotium ochraceum.*
  - Spores globose, under 10 μ long .. .. 462. *S. coarctatum.*
- Gleba bronze or almost black.
  - Spores obovate or elliptical, sepia coloured . 463. *S. melanosporum.*
  - Spores globose, ferruginous .. .. 464. *S. agaricoides.*

Spores echinulate.
- Peridium smooth; spores obovate .. .. 465. *S. leucocephalum.*
- Peridium rough; spores globose .. .. 466. *S. Rodwayi.*



[*Photo. by S. Tee and W.P.C.*

Figure 62.—*Secotium coarctatum* Berk. (No. 462). Beaumont, near Adelaide.

461. **Secotium ochraceum** Rodw. (L., *ochraceus*, ochre-coloured).—Peridium pale ochre-brown, subglobose, base slightly excavated, $\frac{2}{5}$ to $\frac{4}{5}$in. (1 to 2 cm.) diameter, tomentose, very thin, hardly apparent; drying dingy brown, becoming rugulose. Stipe short, 3 to 5 mm. long, 2 mm. thick, pallid brown, equal, tomentose, hollow; columella not expanded at the apex. Gleba ochraceous, labyrinthiform, cells minute, 1 to 2 mm. long, dissepiments thick. Spores smooth, pallid ferruginous, elliptical, bluntly pointed at both ends, 12 to 17 x 6 to 9 μ. —Cunningham. South Australia—National Park. Tasmania. July.

462. **Secotium coarctatum** Berk. (L., *coarctatus*, pressed together).—Peridium pallid greyish-brown, obovate or depressed-globose, umbilicate, base strongly excavated and truncate, up to $\frac{1}{2}$in. (12 mm.) high, $\frac{1}{2}$ to $\frac{4}{5}$in. (12 to 20 mm.) wide, rugulose, minutely and densely tomentose, coriaceous, thick; white when fresh, pallid brown and rugulose when dried. Stipe greyish, up to $\frac{4}{5}$in. (2 cm.) high, usually shorter, 2 to 3 mm. thick, glabrous or tomentose, tapering from base to apex, hollow or stuffed; columella thickened at the apex. Gleba pallid

grey or tinted tan colour, labyrinthiform, cells very minute, up to 0.5 mm. long, very numerous, dissepiments very thin, whole gleba crumbling readily when cut. Spores smooth, tinted yellow, almost hyaline, subglobose to obovate, shortly pedicellate, 5 to 8 μ, epispore thick. Solitary on the ground.—Cunningham. The plants are fragrant when fresh. South Australia—Under bushes of *Acacia armata* R. Br., Beaumont; Kinchina. New South Wales. Western Australia. March to June. (Figure 62.)

463. **Secotium melanosporum** Berk. (Gr., *melas*, black; *spora*, seed).—Peridium dingy grey, darker above, strongly depressed-globose, deeply umbilicate, base deeply excavated, truncate, $1\frac{1}{5}$ to $1\frac{3}{5}$in. (3 to 4 cm.) high, up to $1\frac{1}{5}$in. (3 cm.) wide, finely scabrid and longitudinally striate; dingy-grey and minutely rugulose when dried. Stipe dingy-grey, up to $1\frac{3}{5}$in. (4 cm.) long, $\frac{1}{3}$ to $\frac{1}{2}$in. (8 to 12 mm.) thick, stout, woody, equal, scabrid, central portion coarsely cellular; columella strongly thickened at the apex. Gleba dark sepia-brown, almost black, cellular,

[*Photo. by Professor T. G. B. Osborn.*

Figure 63.—*Secotium melanosporum* **Berk. (No. 463). Monarto South.**

cells minute, up to 0.5 mm. long, laterally compressed, dissepiments thin, whole context tough and resistant. Spores smooth, sepia-coloured, obovate or less commonly elliptical, bluntly pointed at one end, rounded at the other, variable in size, 5 to 11 x 4 to 6 μ; epispore thin. Solitary on the ground.—Cunningham. South Australia—Monarto South, Halidon. Western Australia. New South Wales. Broken Hill. May, July. (Figure 63.)

464. **Secotium agaricoides** (Czern.) Hollos. (Like the Genus *Agaricus*).—Peridium dingy-grey, ovate, obtusely conical or subglobose, apex obtuse, base abruptly rounded or truncate, excavated, up to $3\frac{1}{5}$in. (8 cm.) high and 2in. (5 cm.) broad, minutely scabrid and finely longitudinally striate, margin lacerate, often lobed. Stipe very short, almost obsolete, dingy grey, scabrid, stuffed, up to $\frac{4}{5}$in. (2 cm.) long and $\frac{3}{4}$in. (18 mm.) wide at the base, where it is sometimes much inflated; columella thickened at the apex, free throughout. Gleba dark bronze-brown, lamellate, lamellae sinuate, margins finely serrate, sparsely anastomosing, vertically arranged around the inner wall of the peridium. Spores smooth, ferruginous, globose or subglobose, 5 to 8 μ, sometimes shortly pedicellate; epispore thick. Solitary on the ground in open grassy areas.—Cunningham. South Australia—Greenhill Road. Western Australia. New Zealand. Europe. North Africa. North America. April.

465. **Secotium leucocephalum** Mass. (Gr., *leukos*, white; *kephalon*, the head).—Peridium dingy-grey, depressed-globose, somewhat umbilicate, base truncate, excavated, $\frac{1}{8}$ to $\frac{1}{4}$in. (9 to 12 mm.) high, $\frac{4}{5}$ to 1in. (20 to 26 mm.) wide, smooth, minutely longitudinally striate, glabrous, margin tardily separating from the stipe; drying pallid brown, surface becoming rugose. Stipe whitish, slender, $\frac{1}{2}$ to 1in. (12 to 25 mm.) long, 3 to 4 mm. thick, attenuate downwards, solid, striate, smooth, polished; columella expanded at the apex. Gleba ferruginous, cellular, cells laterally compressed, up to 3 mm. long, dissepiments thin. Spores verruculose, pallid ferruginous, obovate or obovate-elliptical, commonly lachrymiform, rounded at one end, pointed at the other, 9 to 11 x 5 to 7 μ; epispore thin. Solitary on sandy soil.—Cunningham. South Australia—Mount Lofty, Waterfall Gully. New Zealand. June, August.

466. **Secotium Rodwayi** Mass. (After Leonard Rodway, C.M.G., for many years Government Botanist of Tasmania).—Peridium ochraceous white, depressed-globose, umbilicate, base deeply excavated, $\frac{4}{5}$ to $1\frac{1}{5}$in. (2 to 3 cm.) diameter, tomentose; drying dingy-brown, becoming rugulose. Stipe hardly apparent, 3 x 2 mm., subequal, hollow, tomentose. Gleba pallid-ochraceous, labyrinthiform, cells minute, 1 mm. long, dissepiments thin. Spores verruculose, hyaline, globose or subglobose, apiculate, 6 to 9 μ; epispore thin. Hypogean, solitary in sandy soil.—Cunningham. South Australia—Mount Lofty. Tasmania. April, June.

LYCOPERDALES.

Peridium usually epigaean, sessile or stipitate, of 2, 3, or 4 layers, dehiscing by an apical pore (or by several pores), by weathering of the apex of the endoperidium, circumscissile cleavage of the endoperidium, or irregular rupture of this membrane. Gleba at maturity pulverulent, with a copiously developed capillitium. Basidia 1 to 8-spored.—Cunningham.

TULOSTOMATACEAE.

Plants at first hypogaean, completing their development below ground, becoming elevated upon a rapidly elongating stem as they approach maturity. Peridium 2-layered, borne at the apex of a simple but well developed stem which in *Podaxon* traverses the gleba as a columella. Gleba of spores and a well developed capillitium of simple or branched, hyaline or coloured hyphae. Basidia bearing apically (laterally in *Tulostoma*) 1 to 4 coloured, smooth or verrucose spores.—Cunningham.

PODAXONOIDEAE.

Basidia arranged in fasciculate clusters which are persistent at maturity.

PODAXONEAE.

Peridium carried at the apex of a stem which traverses the gleba, dehiscing by irregular longitudinal fissuring.

PODAXON Desvaux.

(Gr., *pous, podos,* a foot; *axon*, axis.)

Plant at maturity consisting of a peridium borne on a strongly developed stem, which traverses the gleba as an axile columella and is firmly attached to the apex of the peridium. Peridium of two layers, a fugacious scaly exoperidium, and a persistent membranous endoperidium; dehiscing by longitudinal fissure and by becoming free from the stem at the base. Gleba of spores and a copious capillitium, to the threads of which are attached the fascicles of basidia; capillitium threads simple, sparingly branched, scantily septate, flattened, coloured or hyaline. Spores coloured, smooth, continuous, with a 2-layered wall apically perforate by a distinct germ pore; borne on short sterigmata on the clavate or subglobose basidia. Growing solitary in sandy soil.—Cunningham.

KEY TO THE SPECIES.

Capillitium copious, tough; threads deeply coloured. Spores chestnut or reddish-brown, often fuscous and opaque .. .. 467. *Podaxon pistillaris.*

Capillitium scanty, tenuous and fragile, threads hyaline or tinted only. Spores olivaceous or pallid chestnut, not reddish .. .. 468. *P. loandensis.*

467. **Podaxon pistillaris** (L.) Fr. (Syns., *Podaxon aegyptiacus* Mont.; *Podaxis indica* (Spreng.) Massee.) (L., *pistillum*, a pestle).—Plant to 6in. (15 cm.) tall. Peridium ovate-oblong, 1½ to 2¾in. (3 to 7 cm.) tall, ½ to 1¼in. (1 to 3 cm.) diameter; exoperidium in the form of a few closely appressed scales, which usually fall away at maturity; endoperidium membranous, externally white or bay-brown, sometimes ferruginous, at first smooth, shining or silky fibrillose, becoming wrinkled and in old specimens longitudinally lacerate; apex bluntly acuminate or rounded. Stem 1⅝ to 3½in. (4 to 8 cm.) tall, 2 to 10 mm. diameter, covered with white, crustose, brittle fibrils, arranged irregularly (as imbricately or spirally), disappearing readily when the stem appears brown and longitudinally sulcate, smooth, often twisted, tapering from base to apex, and produced below into a bulbous attachment, consisting of hyphae and sand particles, sometimes appearing volvate due to persistence of part of the peridium. Gleba dense, ranging in colour from olivaceous through reddish-brown to black; capillitium

[*Photo. by Professor T. G. B. Osborn.*

Figure 64.—*Phellorina inquinans* **Berk.** *In situ* **amongst grass, etc., Monarto South.**

threads deeply coloured, olivaceous or reddish-brown, sparingly septate, scantily branched, often flattened. Spores obovate or shortly elliptical, reddish-brown, 10 to 16 x 9 to 12 μ; truncate apically, and thickened to 4 μ frequently with a rudimentary pedicel basally, smooth, apically perforate.—Cunningham. South Australia—Ooldea, Wilgena, Miller's Creek near Stewart's Range, near Wirrealpa (Flinders Range), Cooper's Creek near Lake Eyre, Minnie Downs near Diamantina, Pedirka, Ernabella (Musgrave Ranges). Central Australia—Alice Springs to Jay River, Macdonald Downs, Cockatoo Creek, Mount Liebig. Queensland—Arrabury Station near Cordillo. New South Wales—Twenty miles east of Broken Hill. India. Africa. Madagascar. May, August, December.

468. **Podaxon loandensis** Welw. et Currey. (Syns., *Podaxon Muelleri* P. Henn.; *Chainoderma Drummondii* Mass.) (After Loanda in West Africa).—Plants similar to the preceding, but differing in typical plants in the characters of the gleba and spores. Gleba either well developed or scanty, olivaceous or black, not reddish, arachnoid, fragile; capillitium threads hyaline or tinted only, sparingly

septate and scantily branched. Spores obovate or shortly elliptical, olivaceous or chestnut-brown, 11 to 15 x 9 to 11 μ, perforated apically, basally shortly pedicellate (or as frequently without this feature), thick-walled, smooth.—Cunningham. South Australia—Near Wirrealpa (Flinders Range). Central Australia—Mount Liebig. West Africa. August, December.

PHELLORINEAE.

Peridium carried at the apex of the stem, a columella being absent; dehiscing by irregular rupture at the apex, or by an apical pore.

[*Photo. by S. Tee and W.P.C.*

Figure 65.—*Phellorina strobilina* **(Kalch.) Lloyd (No. 470.) Naidia, near Blanchetown. Reduced by nearly $\frac{2}{3}$.**

PHELLORINA Berk.

(Gr., *phellos*, cork; *rhinos*, the skin.)

Plant consisting of a 2-layered peridium supported upon a definite stem. Exoperidium roughened, continuous with the exterior of the stem; endoperidium a fine parchment-like membrane seated on the expanded apex of the stem, dehiscing by the irregular breaking away of the apical portion, the whole ultimately becoming cupulate. Stem thick, woody, stout. Gleba of capillitium, spores and persistent fascicles of basidia; capillitium threads long, simple, flattened, rarely branched and sparingly septate. Spores globose, tinted yellow, verruculose. Basidia bearing apically 1 to 4 spores on short sterigmata. Growing solitary in sandy soil.—Cunningham.

469. **Phellorina inquinans** Berk. (Syn., *Xylopodium Delastrei* Mont.) (L., *inquinans*, staining, dying).—Plant to $3\frac{1}{2}$in. (9 cm.) tall. Peridium pyriform, $1\frac{1}{4}$ to 2in. (3 to 5 cm.) tall, $\frac{3}{4}$ to $1\frac{5}{8}$in. (2 to 4 cm.) diameter; exoperidium

ochraceous, continuous with the stem, covered with coarse overlapping scales, which are longitudinally grooved and irregularly arranged; endoperidium membranous, shining, smooth, cream-coloured or white, continuous with the stem, rupturing by irregular breaking away of the upper surface and becoming urceolate. Stem 1½ to 1⅝in. (3 to 4 cm.) long, 6 to 12 mm. diameter, solid, of two layers, an outer fibrillose scaly layer, and an inner ochraceous tough and woody layer, bulbous at the base. Gleba reddish-brown, pulverulent; capillitium threads simple, flattened, sparsely septate, tinted, almost hyaline. Spores globose, tinted yellow, 6 to 8.5 μ, covered with flat-topped coarse warts, appearing areolate.—Cunningham. South Australia—Kinchina and Monarto South, Minnie Downs near the Diamantina. Central Australia—Mount Liebig. Victoria. South Africa. North America. July, August, November. (Figure 64.)

470. **Phellorina strobilina** (Kalch.) Lloyd. (Syns., *Scleroderma strobilina* Kalch., *Xylopodium ochroleucum* Cke. et Mass.) (L., *strobilinus*, like the artichoke).—Differing from the preceding in the nature of the exoperidium, which is covered with large, thick, pyramidal, persistent, zoned scales which are larger and more prominently developed apically. Gleba and spores as in *P. inquinans*.—Cunningham. South Australia—Monarto South, Naidia near Blanchetown (11in. (27.5 cm.) high, peridium 3in. (7.5 cm.) broad). Queensland. October. (Figure 65.)

CHLAMYDOPUS Spegazzini.

(Gr., *chlamys, chlamydos*, a cloak; *pous*, a foot.)

Plant consisting of a long stem bearing upon its dilated apex the 2-layered peridium. Exoperidium fragile, breaking away in pieces; endoperidium membranous, tough, persistent, dehiscing by an apical pore which enlarges as the plant ages. Stem enlarged apically, solid, supported basally in a fibrillose, cupulate volva. Gleba of spores and capillitium, threads simple or sparingly branched, inmixed with numerous clusters of persistent, fasciculate basidia. Spores coloured, verrucose, globose, continuous. Basidia bearing apically 1 to 4 spores on short sterigmata.—Cunningham.

471. **Chlamydopus Meyenianus** (Klotzch.) Lloyd. (Syn., *Tylostoma maximum* Cke. et Mass.) (*Meyenianus*, after Franz Meyen, 1804-1840, author of Pflanzen-Pathologie).—Peridium to ¾in. (2 cm.) tall, ¾ to 1½in. (2 to 3.5 cm.) diameter, depressed globose or pulvinate; exoperidium fugitive, soon breaking up and falling away, of sand or other debris mixed with hyphae; endoperidium tough and membranous, ochraceous, bleaching to a pallid cream colour, smooth or finely asperate, firmly attached to the peripheral apex of the stem, dehiscing by a plane apical mouth which later becomes torn irregularly. Stem to 5⅛in. (13 cm.) tall, and ½in. (12 mm.) diameter, woody, solid, grooved longitudinally, silky fibrillose or with a few coarse peeling scales, sometimes arranged as an annulus in old specimens, ochraceous, attenuate below and seated in a fragile volva of two layers, gradually thickened above and expanded into a flattened, discoid, truncate apex. Gleba ochraceous or yellowish-brown; capillitium densely developed, of long hyaline or tinted threads attached both to the apex and inner wall of the endoperidium. Spores globose, tinted yellow, 6 to 9.5 μ, mostly 7 to 8 μ, covered with coarse flat-topped warts, appearing areolate.—Cunningham. South Australia—Miller's Creek, Minnie Downs. Western Australia—Kurrawang, Gascoyne River. Peru. North America. June to August.

TULOSTOMOIDEAE.

Basidia not fasciculate and disappearing at maturity.

TULOSTOMEAE.

Elaters not present in the gleba; peridium dehiscing by an apical pore.

TULOSTOMA Persoon.

(Gr., *tylos*, a knob; *stoma*, a mouth.)

Peridium stipitate, globose to depressed-globose; consisting of an outer thin, usually fugacious exoperidium, and a thin membranous, coloured or white, smooth or rough endoperidium; dehiscence by an apical pore, which may be definite or indefinite, naked or fibrillose, erumpent-tubular, umbonate or plane. Stipe inserted in a socket at the base of the endoperidium to which it is attached; woody,

smooth, or scaly, striate or not, concolorous throughout, stuffed; usually with a mycelial bulb at the base. Gleba of capillitium and spores; capillitium copious, of numerous tinted or hyaline, very long, usually branched threads attached to the endoperidium; septate or not, septa inflated or not. Spores coloured, globose or subglobose, seldom angular, smooth or variously roughened. Solitary, gregarious or caespitose on the ground or more rarely on decaying wood.—Cunningham.

KEY TO THE SPECIES.

Mouth definite.
- Mouth tubular, margin entire.
  - Spores finely verruculose, often almost smooth.
    - Peridium smooth or practically so .. .. 473. *Tulostoma albicans.*
    - Peridium finely pubescent .. .. 472. *T. pubescens*
  - Spores distinctly echinulate, aculeate or warted.
    - Peridium uncoloured (dingy white or pallid tan).
      - Peridium smooth.
        - Spores 5 to 8 μ .. .. 475. *T. McAlpinianum.*
        - Spores 9 to 13 μ .. .. *T. macrosporum.*
      - Peridium rough with the adhering persistent exoperidium .. .. .. *T. adhaerens.*
    - Peridium deeply coloured.
      - Peridium chestnut brown, mouth more deeply coloured than the peridium *T. brumale.*
      - Peridium chocolate brown .. .. .. *T. Perpusii.*
- Mouth fibrillose-fimbriate.
  - Spores perfectly smooth .. .. 476. *T. obesum.*
  - Spores finely but minutely verruculose .. .. 477. *T. minutum.*
  - Spores distinctly echinulate, aculeate or warted.
    - Spores closely echinulate-verrucose .. .. 478. *T. subfuscum.*
    - Spores with echinulae arranged in striae . 479. *T. striatum.*

Mouth indefinite.
- Mouth merely an indefinite torn aperture.
  - Spores smooth .. .. 480. *T. pulchellum.*
  - Spores minutely verruculose .. .. 481. *T. australianum.*

Mouth definite; circular or elliptical, tubular or plane.
Spores finely and distinctly verruculose.

472. **Tulostoma pubescens** Cunn. (L., *pubescens*, beginning to have a beard, pubescent).—Peridium depressed-globose, up to $\frac{2}{5}$in. (10 mm.) high, $\frac{4}{5}$in. (20 mm.) diameter; exoperidium persistent, dingy brown, almost black, in the nature of almost coarse mycelial fibres mixed with vegetable débris; endoperidium ferruginous, pubescent with closely appressed silky threads. Mouth definite, 2.5 to 3 mm. diameter, circular, plane. Stipe 1$\frac{3}{5}$in. (4 cm.) x 6 mm., equal, densely pubescent, colour of the peridium, stuffed, rugulose. Gleba reddish-brown; capillitium hyaline, threads sparingly septate, slightly thicker than the spores, branched, septa plane. Spores globose or subglobose, 4 to 5.5 μ, apiculate; epispore finely and delicately verruculose, pallid ferruginous, 0.75 μ thick. Solitary on the ground.—Cunningham. South Australia—Port Gawler. April.

473. **Tulostoma albicans** White (L., *albicans*, turning white).—Peridium depressed globose, up to $\frac{2}{5}$in. (10 mm.) high, $\frac{1}{2}$in. (12 mm.) diameter; exoperidium soon falling away from the upper portion but persisting at the base of the endoperidium which is smooth, thin papyraceous, dingy white or pallid tan. Mouth small, 1 mm. diameter, circular, short-tubular, entire. Stipe to $\frac{4}{5}$ to 1$\frac{3}{5}$in. (2 to 4 cm.) x 3 to 6 mm., equal, bay-brown, finely striate, fibrillose, stuffed, frequently with a small mycelial pad at the base. Gleba reddish-brown; capillitium hyaline or tinted, threads branched, sparsely septate, septa slightly swollen. Spores globose or subglobose, 4 to 6 μ, frequently apiculate; epispore pallid ferruginous, finely and moderately verruculose, 1 μ thick. Solitary or gregarious on the ground.—Cunningham. South Australia—Beaumont, Reynella, Middleton, Kinchina, near Overland Corner, Berri, South Hummocks, Flinder's Range near Port Augusta, Ooldea, Big Swamp (12 miles west of Port Lincoln), Talia (E.P.), Elliston (E.P.), Ernabella (Musgrave Ranges). Central Australia—Rodina, Hermannsburg, Mount Liebig. New South Wales. January, February, June, July, August, September, October.

474. **Tulostoma albicans** var. *nigrostium* Cunn. (L., *niger*, black; *ostium*, door or mouth).—Peridium similar to *T. albicans* but differing in that the mouth is strongly coloured, usually brown, frequently lead-coloured.—Cunningham. South Australia—Encounter Bay. New South Wales. May, July, September.

Spores strongly verrucose or verrucose-echinulate.

475. **Tulostoma McAlpinianum** Lloyd. (After D. McAlpine, for many years Government Vegetable Pathologist for Victoria).—Peridium globose to depressed-globose up to ½in. (12 mm.) high, ⅝in. (15 mm.) diameter; exoperidium soon falling away from the upper portion, but remaining at the base of the endoperidium as a thickened, closely adherent disc; endoperidium smooth, partly covered with adhering particles of the exoperidium, or slightly pitted, papyraceous, dingy white or pallid tan. Mouth small, 1 to 1.5 mm. diameter, circular, short-tubular, entire. Stipe ¾ to 3½in. (2 to 8 cm.) x 3 to 5 mm. equal, slightly or not thickened basally, coloured bay- or chestnut-brown, fibrillose, striate, woody, stuffed. Gleba reddish-brown; capillitium hyaline or tinted, threads sparingly branched, sparsely septate, septa slightly swollen. Spores globose or subglobose, 5 to 8 μ; epispore pallid ferruginous, coarsely, bluntly and sparsely verrucose, 1 μ thick. Solitary or gregarious on the ground.—Cunningham. South Australia—Adelaide, near Morgan, Kinchina, Ooldea, Penola State Forest (S.E.). New South Wales. March, June to August, November.

Differs from the two preceding species in the spore markings.

Tulostoma macrosporum Cunn. has been found at Dubbo, New South Wales; *T. adhaerens* Lloyd at Narrabeen, New South Wales; *T. brumale* Pers. in Victoria and New Zealand; and *T. Purpusii* Hennings in Sydney. None of these species has yet been found in South Australia.

Mouth definite, fibrillose.

Spores perfectly smooth.

476. **Tulostoma obesum** Cke. et Ellis (Syn., *T. poculatum* White.) (L., *obesus*, fat).—Peridium depressed-globose, up to ⅖in. (10 mm.) high, ½in. (12 mm.) diameter; exoperidium breaking away completely save the persistent basal portion; endoperidium fawn-coloured or dingy-white, smooth. Mouth raised, surrounded by a circular, fibrillose area, which may attain to a diameter of 3 mm. Stipe ¼ to 1⅗in. (2 to 3 cm.) x 3 to 5 mm., tan-coloured, sulcate, striate, equal, stuffed, slightly bulbous at the base. Gleba ferruginous; capillitium tinted or hyaline, threads sparingly branched, slightly swollen at the septa. Spores globose or subglobose, 4 to 6 μ, apiculate; epispore pallid ferruginous, perfectly smooth, 0.75 μ thick. Solitary or gregarious on the ground.—Cunningham. South Australia—Beaumont (Adelaide), Kinchina, Port Augusta district. Central Australia—Macdonald Downs (160 miles N.E. of Alice Springs). New South Wales. New Zealand. North America. May to August, November.

Spores finely and distinctly verruculose.

477. **Tulostoma minutum** White (L., *minutus*, minute).—Peridium depressed-globose, ¼ to ⅖in. (0.5 to 1 cm.) high, ⅖ to ⅘in. (1 to 2 cm.) diameter; exoperidium dingy brown, imperfectly breaking away from the upper part of the endoperidium but remaining at the base; endoperidium pallid-chestnut-brown, membranous. Mouth slightly raised, fibrillose, small, 2 mm. diameter. Stipe ⅖ to ⅘in. (1 to 2 cm.) x 2 to 4 mm., slender, stuffed, brown, striate, frequently with a small mycelial pad at the base. Gleba ferruginous; capillitium tinted, threads sparingly branched, septa slightly swollen. Spores globose or subglobose, 4 to 6 μ, apiculate; epispore ferruginous, minutely and closely verruculose, 1 μ thick. Solitary on the ground.—Cunningham. South Australia—Beaumont, Berri, Barton. Central Australia—Dashwood Creek. January, February, August.

Spores verrucose.

478. **Tulostoma subfuscum** White. (L., *subfuscus*, somewhat fuscous).—Peridium depressed-globose, up to ½in. (12 mm.) high, ⅝in. (15 mm.) diameter; exoperidium dingy brown, imperfectly breaking away from the apical portion but remaining as a firm membrane at the base of the endoperidium; the latter smooth, varying in colour from bay-brown to dingy ferruginous, tough, membranous. Mouth raised, minute, surrounded by a scanty, fibrillose zone 1 to 2 mm. diameter. Stipe ¾ to 1⅛in. (2 to 3 cm.) long x 2 to 3 mm., fibrillose or

scaly, leathery, dingy brown, striate, equal, stuffed, with a small mycelial bulb at the base. Gleba ferruginous; capillitium hyaline or tinted, threads branched, sparsely septate, slightly thickened at the septa. Spores globose to subglobose, 4 to 6 μ, sometimes apiculate; epispore pallid ferruginous, finely and moderately verrucose, 0.75 μ thick. Solitary or gregarious on the ground.—Cunningham. South Australia—Kinchina. New South Wales. North America. June, November, December.

479. **Tulostoma striatum** Cunn. (L., *striatus*, with striae).—Peridium depressed-globose, up to $\frac{3}{5}$in. (15 mm.) high, $\frac{4}{5}$in. (20 mm.) diameter; exoperidium pallid tan colour, soon falling away save where persistent at the base, in some specimens persisting as irregular roughened patches; endoperidium pallid-tan or dingy-white, smooth, papyraceous. Mouth raised, irregularly circular, surrounded by a fibrillose zone, up to 3 mm. diameter. Stipe $\frac{4}{5}$ to $2\frac{2}{5}$in. (2 to 6 cm.) x 2 to 4 mm., equal, pallid-tan, stuffed, striate, slightly enlarged towards the base. Gleba ferruginous; capillitium hyaline, threads somewhat flattened, branched, sparingly septate, slightly swollen at the septa. Spores globose or subglobose, 4 to 6 μ; epispore coarsely and sparsely verrucose, verrucae arranged in striae, 1 μ thick. Solitary or caespitose on the ground.—Cunningham. South Australia—Grange, Kinchina, Berri, Ooldea. New South Wales. January, June, August, November.

Mouth Indefinite.

Mouth merely an indefinite torn aperture.

480. **Tulostoma pulchellum** Sacc. (L., *pulchellus*, somewhat pretty).—This species was collected by J. G. O. Tepper and so probably came from South Australia. Lloyd says that the colour is now chocolate brown, the surface scurfy under a lens. The stem is very short and does not appear to be inserted in a socket. The mouth is an indefinite opening. The gleba is rust colour. The spores globose, smooth, pale-coloured, 8 to 9 μ (unusually large for this genus).

481. **Tulostoma australianum** Lloyd. (*Australianus*, Australian).—Peridium strongly depressed-globose, almost pulvinate, up to $\frac{3}{5}$in. (15 mm.) high, 1in. (24 mm.) diameter; exoperidium falling completely away, save at the base; endoperidium smooth, dingy white, tough, thick, membranous. Mouth indefinite, plane, a simple irregularly torn aperture. Stipe up to $\frac{3}{5}$in. (15 mm.) long x 6 mm. thick, equal, covered with coarse deciduous scales, markedly striate, woody, stuffed, bay-brown, with a strongly developed bulbous base. Gleba ferruginous; capillitium hyaline, threads branched, moderately swollen at the somewhat sparse septa. Spores globose or subglobose, 4 to 6 μ; epispore finely and sparsely verrucose, pallid ferruginous, 0.75 μ thick. Solitary on the ground.—Cunningham. South Australia—Monarto South, Barton (East-West Line). New South Wales. May, June, September.

BATTARRAEA Pers.

(After the Italian botanist Antonio Battarra.)

Plant with a small applanate peridium borne upon a long and strongly developed stem seated in a basal volva. Peridium of two layers; exoperidium of sand particles mixed with hypae, soon disappearing, endoperidium tough and membranous, dehiscing by circumscissile cleavage of the upper hemisphere from the periphery of the discoid apex of the stem. Gleba of spores and capillitium; capillitium of two types, long sparsely branched threads and elaters. Spores globose, punctate, of three layers, the outer being somewhat gelatinous. Basidia bearing 1-4 spores apically on long sterigmata. Growing solitary, partially buried in sand.—Cunningham.

482. **Battarraea Stevenii** (Liboschitz) (Syn., *B. Tepperiana* Ludw.) (A surname).—Peridium pulvinate or depressed globose, seated on the expanded discoid apex of the stem, to $2\frac{1}{2}$in. (6 cm.) diameter, and $\frac{3}{4}$ to $1\frac{1}{4}$in. (2 to 3 cm.) tall, base white or ochraceous and appearing roughened when the gleba is removed, smooth and white beneath; apically at first consisting of two membranes, the outer falling away in flakes, the inner dehiscing circumscissilely and falling away in one piece as a distinct calyptra. Stem 4 to 14in. (10 to 35 cm.) tall, $\frac{1}{5}$ to $\frac{3}{5}$in. (5 to 15 mm.) diameter, tapering below and attached to the substratum by a definite 2-layered volva (which is not gelatinous at any time of

its development), covered externally with numerous coarse, overlapping scales which are more numerous and coarse apically, ochraceous or bay-brown, weathering away ultimately and exposing the cream-coloured, fluted exterior, hollow or stuffed with silky fibres. Gleba pulverulent, with a capillitium of two types, single hyaline threads predominantly vertically arranged, and elaters which are fusiform or cylindrical bodies with annular or spiral thickenings on the inner wall. Spores globose or subglobose, often apiculate, 5 to 7 μ, commonly 5 to 5.5 μ, finely and sparsely punctate.—Cunningham. South Australia—Grounds of Adelaide Hospital, Grange, Tapley's Hill Road, Normanville, Monarto South, Murray Bridge, Nankeri, Pinnaroo, Naidia, Halidon, Alawoona, Brinkworth,

[*Photo. by G. C. McLennan.*

Figure 66.—*Battarraea Sterenii* (Libosch.) (No. 482). Much reduced in size, showing the expanded plant with the cup-shaped volva which is buried in the ground, and at the upper end the ruptured exoperidium, with the loose upper portion separating and exposing the mass of brown spores on the expanded disc. Adelaide Hospital Grounds.

Nonning, Tumby Bay, Minnie Downs (Diamantina). New South Wales. Western Australia. Europe. Asia. North and South America. January, April to August, October, December. (Figures 66 and 67.)

LYCOPERDACEAE.

Peridium of two to four layers, dehiscing by an apical stoma (or by several), by weathering of the apex, or irregular rupture. Capillitium copious, attached or free, simple or branched. Basidia bearing 4 spores on long sterigmata.—Cunningham.

LYCOPERDEAE.

Peridium of two layers, dehiscing by an apical stoma, by weathering of the apex (*Calvatia*), or by irregular fissuring (*Mycenastrum*). Spores globose, typically echinulate, rarely smooth.—Cunningham.

CALVATIA Fries.

(L., *calva*, a skull or scalp.)

Peridium subglobose to pyriform, frequently with a well-developed rooting base; of two layers, an outer exoperidium which may be warted, spinose, furfuraceous, granular or smooth, and flakes away in irregular fragments; and an inner endoperidium which is thin, papyraceous or membranous, and flakes away irregularly from the apex, but persists towards the base; sterile base present, well developed or scanty. Gleba coloured, of capillitium and spores; capillitium threads long, equal, sparingly branched, septate or continuous, attached to the inner walls of the endoperidium. Spores globose or shortly elliptical, continuous, coloured, rough or smooth. Solitary or in small groups on the ground in pastures, sand-dunes or outskirts of the forest.—Cunningham.

[*Photo. by S. Tee.*

Figure 67.—*Battarraea Stevenii* **(Libosch.) (No. 482). Partly expanded plant. Adelaide Hospital Grounds.**

KEY TO THE SPECIES.

Diaphragm present.
- Spores smooth .. .. *Calvatia caelata.*
- Spores verrucose .. .. 483. *C. lilacina.*

Diaphragm absent.
- Plants large, exoperidium smooth, leathery .. .. 484. *C. gigantea.*
- Plants small, exoperidium furfuraceous .. .. .. 485. *C. candida.*

Calvatia caelata (Bull.) Morgan has not yet been recorded from South Australia.

483. **Calvatia lilacina** (Berk. et Mont.) Lloyd. (L., *lilacinus*, lilac-coloured).—Peridium up to 6in. (15 cm.) diameter, subglobose to subpyriform, tapering abruptly into a large, well-developed, strongly crenulate rooting base; exoperidium smooth or more frequently floccose, cream to bay-brown, often areolate, thin, fragile, fugacious; endoperidium brown, thin, fragile, flaking away irregularly from the apical portion. Sterile base well-developed, persistent, cellular at the periphery, hemi-compact within, separated from the gleba by a prominent diaphragm. Gleba some shade of purple, sometimes with a greyish tinge, at first compact, soon pulverulent; capillitium threads long, branched, septate, equal, pallid olivaceous. Spores globose, 5.5 to 7.5 μ, occasionally apiculate; epispore violaceous, verrucose. Solitary on the ground, especially in sandy areas.—Cunningham. South Australia—Beaumont, Eagle-on-the-Hill, National Park, Morphett Vale, Encounter Bay district, Ernabella (Musgrave Ranges). New South Wales—Sydney, Pilliga Scrub, Krambach near Taree, Baan Baa. Victoria—Craigie near Ararat. New Zealand—Queenstown, &c. Europe. South Africa. North America. January, April to June, October, November.

484. **Calvatia gigantea** (Pers.) Cunn. (L., *giganteus*, gigantic).—Peridium subglobose, up to 16in. (40 cm.) diameter, sessile, with a cord-like rooting base; exoperidium smooth, finely tomentose, closely resembling chamois leather, fragile, cream or yellowish, fugacious; endoperidium brown, thin, fragile, flaking away irregularly. Sterile base scanty and poorly developed, floccose, frequently wanting, diaphragm absent. Gleba yellowish, becoming olivaceous, hemi-compact; capillitium threads long, sparingly branched, septate, olivaceous. Spores globose, 4 to 5.5 μ, occasionally apiculate; epispore olivaceous, verruculose. Solitary on the ground in pastures.—Cunningham. South Australia—Kinchina, Flinders Range near Quorn. Victoria. New Zealand. Europe. North America. August, November.

485. **Calvatia candida** (Rostk.) Hollis. (L., *candidus*, shining, white).—Peridium up to nearly 3in. (7 cm.) diameter, subglobose to pyriform, base frequently crenulate, tapering abruptly into a strongly developed, white, cord-like rooting base; exoperidium thin, furfuraceous, ochraceous, frequently areolate, fugacious; endoperidium thin, papyraceous, ochraceous or chestnut brown, flaking away irregularly from the apex. Sterile base usually well-developed, sometimes scanty, floccose, yellowish, diaphragm absent. Gleba pallid olivaceous, hemi-compact; capillitium threads sparingly branched, sparsely septate, equal, olivaceous. Spores globose, 4 to 5.5 μ, frequently apiculate; epispore olivaceous, finely and sparsely verruculose. On the ground in small groups.—Cunningham. South Australia—Beaumont, Glen Osmond, National Park, Monarto South, Kinchina, Wilpena Pound and Baratta (Flinders Range), Pinnaroo, Maitland, Minnie Downs (Diamantina). Central Australia—Mount Liebig. New South Wales. Victoria—Nathalia (near Murray River). Western Australia—Narrogin. Europe. February, April to October, December.

486. **Calvatia candida** var. *rubro-flava* (Cragin) Cunn. (L., *ruber*, red; *flavus*, bright yellow).—Differs from the type in the reddish-ochre colour of the gleba. New South Wales—Sydney. Not yet recorded in South Australia. North America.

487. **Calvatia candida** var. *fusca* Cunn. (L., *fuscus*, brown, tawny).—Differs from the type in the gleba being dark olivaceous, almost fuscous. South Australia—Kinchina. July.

LYCOPERDON Tournefort *ex* Persoon.

(Gr., *lykos*, a wolf; *perdomai*, to break wind.)

Peridium variously shaped, with a prominent stem-like base or rooting strand; of two layers, a fugacious exoperidium which is pseudoparenchymatous, warted, spinose or granular; and a persistent endoperidium which is membranous or papyraceous, thin, tough, and dehisces by a solitary apical stoma; sterile base present or absent; diaphragm present or absent. Gleba of capillitium and spores; columella present or absent; capillitium threads long, simple or branched, continuous or septate, hyaline or coloured, attached by one end to the endoperidium, or columella when present. Spores globose or shortly elliptical, con-

tinuous, rough or smooth, coloured, pedicellate or not. Basidia long-sterigmate, 4-spored. Solitary, in groups, or caespitose on the ground or upon rotting wood, stumps, etc., in pastures or the forest.—Cunningham.

This genus comprises the common small puff-balls, setting free a mass of yellowish spores as a fine dust through an apical aperture.

KEY TO THE SPECIES.

Spores without distinct pedicels.
- Capillitium hyaline, freely septate
  - Diaphragm present .. .. 488. *Lycoperdon depressum.*
  - Diaphragm absent.
    - Exoperidium with minute depressions .. *L. subincarnatum.*
    - Exoperidium reticulate with persistent granules .. .. *L. compactum.*
- Capillitium coloured, usually continuous.
  - Capillitium continuous or sparingly branched.
    - Sterile base of large cells, 2 mm. or more.
      - Exoperidium of minute connivent spines .. .. 489. *L. piriforme.*
      - Exoperidium of pointed verrucae .. *L. perlatum.*
    - Sterile base of minute cells, 1 mm. or less.
      - Exoperidium of large cruciate spines. 490. *L. stellatum.*
      - Exoperidium furfuraceous .. .. .. 491. *L. nitidum.*
  - Capillitium freely branched.
    - Sterile base cellular .. .. 492. *L. spadiceum.*
    - Sterile base compact .. .. 493. *L. polymorphum.*
    - Sterile base absent .. .. 494. *L. pusillum.*

Spores long-pedicellate.
- Sterile base well-developed.
  - Exoperidium furfuraceous .. .. 495. *L. glabrescens.*
  - Exoperidium of cruciate spines .. .. 496. *L. scabrum.*
- Sterile base scanty or absent.
  - Exoperidium of pallid, cruciate spines .. .. 497. *L. asperum.*
  - Exoperidium furfuraceous or tomentose .. .. 498. *L. Gunnii.*

488. **Lycoperdon depressum** Bonorden. (Syn., *L. pratense* of Lloyd's identification). (L., *depressus*, kept down, trodden under foot).—Peridium yellow, becoming pallid brown, up to 2in. (5 cm.) diameter, elliptical, obconic or subturbinate, frequently constricted and plicate towards the base; exoperidium of white spines united at their apices, immixed with numerous simple spines and granules, larger and more numerous apically, partially disappearing with age; endoperidium ochraceous or bay brown, dehiscing by a definite apical stoma, later the whole of the apical portion falling away; sterile base occupying the lower third of the peridium, of large cells, bay- or umber-brown, separated from the gleba by a well-defined diaphragm. Gleba yellowish, becoming pallid olivaceous; columella absent; capillitium threads hyaline, simple or sparingly branched, not pitted, septate. Spores globose, 3.5 to 5.5 μ, apedicellate; epispore pallid olivaceous, finely and closely verrucose. Solitary or in small groups on the ground, often forming rings in pastures.—Cunningham. South Australia—Adelaide, Beaumont, Mount Lofty, Upper Sturt, National Park, Eagle-on-the-Hill, Mylor, Bull's Creek, Encounter Bay, Kalangadoo (S.E.). New South Wales. Victoria. Tasmania. New Zealand. Europe. South Africa. January, April to July, December. (Figure 68.)

The species is characterised by the prominent diaphragm, large cellular base, and hyaline, septate, simple or sparingly branched capillitium.

Lycoperdon subincarnatum Peck.—Growing on decaying wood on the forest floor. Not yet recorded for South Australia but occurs in New South Wales.

Lycoperdon compactum Cunn.—A New Zealand species growing on rotting wood on the forest floor, has not yet been recorded for Australia.

489. **Lycoperdon piriforme** Schaeffer *ex* Persoon. (L., *pyrus*, a pear; *forma*, shape).—Peridium up to 4in. (10 cm.) diameter, grey to bay-brown, pyriform, sub-turbinate or subglobose, with a compressed, slender, stem-like base; exoperidium of minute, scattered, brown or black, hemi-persistent, pointed verrucae

and granules; endoperidium brown, membranous, dehiscing by an apical, small, plane, torn stoma; sterile base prominent, forming the stem-like base, cells large, pallid tan or yellowish; diaphragm absent. Gleba greenish-yellow, becoming ferruginous or olivaceous; columella prominent, subglobose; capillitium threads olivaceous, sparingly branched or simple, continuous, not pitted, thick walled, about the diameter of the spores. Spores globose, 3.5 to 4.5 μ, apedicellate; epispore pallid olivaceous, finely verruculose. Solitary, in groups, or caespitose on rotting wood on the forest floor, or on decaying logs and stumps.—Cunningham. South Australia—Beaumont (doubtful), National Park. Queensland. New South Wales. New Zealand. Europe. America. Japan. April, May, October.

[*Photo. by S. Tee.*

Figure 68.—*Lycoperdon depressum* Bon. (No. 488).
On lawn, Adelaide.

Characterized by the minute verrucae of the exoperidium, the (usually) pyriform shape, finely verruculose spores and habit of growing upon rotting wood. It is liable to confusion only with *L. perlatum*, from which it may readily be separated by these characters.—Cunningham.

Lycoperdon perlatum Pers. (*L. gemmatum* Batsch).—Usually on vegetable débris on the forest floor. New South Wales. Tasmania. New Zealand. Not yet recorded for South Australia.

490. **Lycoperdon stellatum** Cke. et Massee. (L., *stellatus*, star-shaped).—Peridium depressed-globose, $\frac{4}{5}$ to $1\frac{1}{5}$in. (2 to 3 cm.) diameter, with a small rooting base; exoperidium of stout, thick, connivent, pallid spines which fall away in small groups but may persist towards the base; endoperidium bay-brown, or cream, smooth save at the base where the exoperidium is partially persistent, membranous, dehiscing by a small, plane, torn, apical stoma; sterile base occupying the lower third of the peridium, ferruginous, cells minute, scarcely visible unless magnified; diaphragm absent. Gleba ferruginous; columella absent; capillitium threads olivaceous, sparingly branched, continuous, thin walled, not pitted, about the diameter of the spores. Spores globose, 3.8 to 4.5 μ, apedicellate; epispore olivaceous, finely and closely verruculose. Solitary on the ground. —Cunningham. South Australia—Israelite Bay, in sandy soil at Encounter Bay. January, May.

The peculiar nature of the exoperidium and the small cells of the sterile base are the characters of the species.

The Encounter Bay specimens had depressed globular peridia, 1¼ to 2in. (3.2 to 5 cm.) broad, 1 to 1¼in. (2.5 to 3.2 cm.) high, with the base flat or broadly conical, the endoperidium near Colonial Buff (XXX.) bleaching to white, the exoperidial warts Light Buff (XV.), opening apically by a laceration 4 to 10 mm. in diameter. When young, the peridia were coarsely echinulate from large closely packed acute warts, up to 3 mm. high with bases of 3 to 4 mm., the warts finally splitting into 2 to 4 elements which remained connivent. As maturity was reached, the whole exoperidium flaked off into very friable angular fragments up to ⅜in. (1.5 cm.) long and 3 to 4 mm. thick, leaving the smooth endoperidium exposed, fragments remaining for a while as a friable collar at the base.

491. **Lycoperdon nitidum** Lloyd. (L., *nitidus*, shining).—Peridium depressed globose, irregular, ¾ to 1⅜in. (2 to 4 cm.) diameter, umber, almost black, crenulate below, with a minute rooting base; exoperidium furfuraceous, flaking away irregularly, almost black; endoperidium papyraceous, umber, polished, dehiscing by a minute, plane, torn apical stoma; sterile base olivaceous, occupying the lower third of the peridium, cells minute, scarcely visible unless magnified; diaphragm absent. Gleba olive-umber; columella absent; capillitium threads simple or sparingly branched, flaccid, olive, thin walled, pitted, continuous. Spores globose or subglobose, apiculate, 3.5 to 4.5 μ; epispore olivaceous, delicately verruculose. On the ground.—Cunningham. South Australia—Clare. August.

This species is characterized by the depressed-globose form, minutely furfuraceous exoperidium, the thin and polished umber-brown endoperidium, scanty, minutely cellular sterile base and pitted capillitium.—Cunningham.

492. **Lycoperdon spadiceum** Persoon. (L., *spadiceus*, date-brown).—Peridium ½ to 1in. (12 to 24 mm.) diameter, subglobose or more commonly shortly pyriform, with a long and slender rooting base, which may sometimes be branched; exoperidium furfuraceous, often in the form of mealy squamules, fugacious; endoperidium umber-brown, papyraceous, smooth, dull, flaccid, sometimes covered with lime granules, dehiscing by an apical, torn, plane stoma; sterile base scanty, occupying the lower third of the peridium or less, of small cells, umber; diaphragm absent. Gleba olivaceous, becoming umber; columella absent; capillitium threads olivaceous, freely branched, continuous, not pitted, about the diameter of the spores. Spores globose, apiculate, 4 to 4.5 μ; epispore olivaceous, minutely but distinctly verruculose. Solitary on the ground.—Cunningham. South Australia—Beaumont, Morphett Vale, Mount Lofty, Morialta, Kuitpo, Kinchina, Encounter Bay, Kalangadoo (S.E.), Big Swamp west of Port Lincoln. Victoria. New Zealand. Europe. April to July.

Characterized by the small, sub-pyriform shape, furfuraceous exoperidium and scanty, small-celled, sterile base. It closely resembles large forms of *L. pusillum*, but is separated readily on account of the presence of the cellular sterile base; and small forms of *L. polymorphum*, but the compact sterile base of the latter serves as a ready means of differentiation.—Cunningham.

493. **Lycoperdon polymorphum** Vittad. (Gr., *polys*, many; *morphē*, shape).—Peridium up to 2½in. (6 cm.) diameter, yellow, becoming brown, depressed globose or more frequently pyriform, with or without a stem-like base, which, when present, is often crenulate; exoperidium of minute spines or verrucae, often furfuraceous, fugacious; endoperidium membranous, often smooth and polished, dehiscing by a small, torn, plane, apical stoma; serile base compact, of the same interwoven hyphae as the gleba, concolorous, frequently scanty; diaphragm absent. Gleba yellowish, becoming olivaceous; columella absent; capillitium threads pallid olive, thin walled, branched, continuous, about the diameter of the spores. Spores globose, 4.5 to 5.5 μ, apiculate; epispore tinted, closely and finely verruculose. Solitary or in small groups on the ground.—Cunningham. South Australia—Mount Lofty, Kinchina, Wilpena Pound, Flinders Range near Port Augusta, Ooldea. New South Wales. New Zealand. Europe. North America. South Africa. April to August, November.

The species is characterized by the nature of the sterile base, which is either of a compact mycelial tissue similar in structure to the gleba, or of cells so minute as to be seen only when considerably magnified. Frequently the sterile base is scanty, when plants approach *L. pusillum;* to this form the name *L. cepaeforme* has been applied, but it is impracticable to maintain, for in the same collection may be present forms with either scanty or well-developed sterile bases. —Cunningham.

494. **Lycoperdon pusillum** Pers. (L., *pusillus*, very small).—Peridium up to $\frac{3}{4}$in. (20 mm.) diameter, globose or subglobose, yellowish, becoming brown, with a strong basal rooting strand; exoperidium covered with minute, fugacious, mealy squamules or flattened verrucae, fugacious; endoperidium membranous, smooth, shining, flaccid, dehiscing by a small, irregular, plane apical stoma; sterile base absent. Gleba yellowish, becoming brown; columella absent; capillitium threads olive, continuous, freely branched, pitted. Spores globose, 3.7 to 5 μ, apiculate; epispore olive, finely but distinctly verruculose. Scattered or in small groups on the ground, often in cultivated areas.—Cunningham. South Australia—Adelaide, Kinchina, Encounter Bay, Overland Corner, Wilpena Pound (Flinders Range), Ernabella (Musgrave Ranges), Ooldea. Central Australia—Mount Liebig. Western Australia—Tammin. New Zealand. Europe. Asia. Africa. America. February, March, May to August, October, November.

This is a small plant with a subglobose peridium, and small but strongly developed rooting base. It is characterized by the absence of a sterile base, flaccid, shining endoperidium and freely branched capillitium. It is separated from small forms of *L. polymorphum* and *L. spadiceum* principally by the absence of a sterile base.—Cunningham.

495. **Lycoperdon glabrescens** Berk. (L., *glabrescens*, becoming smooth).—Peridium up to 2in. (5 cm.) diameter, bay-brown, depressed globose or subglobose, often pyriform, tapering into a well-developed stem-like base; exoperidium of small warts, larger towards the apex, fugacious; endoperidium bay-brown, smooth, membranous, dehiscing by a small, erumpent, apical, torn stoma; sterile base well-developed, cells small, often tinged with purple, occupying the stem-like base; diaphragm absent. Gleba dark olivaceous, often purplish; columella wanting; capillitium threads freely branched, deeply coloured, about the diameter of the spores, pitted, continuous. Spores globose, 4 to 5 μ, pedicels tinted, acuminate; epispore olivaceous, minutely verruculose. On the ground in groups, usually in pastures.—Cunningham. South Australia—Monarto South, Mount Dutton Bay (West Coast). New South Wales. Victoria. Tasmania. New Zealand. January, April to July, November.

The members of the pedicellate-spored section of the genus are all, with one exception, *L. Gunnii*, closely related, and are separated mainly on the nature of the exoperidium. In *L. glabrescens* the sterile base is prominent, but of small cells, a character tending to separate it from *L. asperum*, in which the sterile base is scanty and frequently almost wanting. The minutely verruculose exoperidium separates it from *L. scabrum*.—Cunningham.

496. **Lycoperdon scabrum** (Lloyd) Cunn. (L., *scaber*, rough).—Peridium up to $1\frac{1}{2}$in. (3 cm.) diameter, depressed globose or pyriform, umber, with a well-developed rooting base; exoperidium of long black or brown spines, 1 to 3 mm. long, free at the base, frequently connivent at the apices, fugacious; endoperidium umber, at length smooth, shining, membranous, dehiscing by an erumpent, torn, toothed apical stoma; sterile base occupying the lower third of the peridium, of small cells, concolorous; diaphragm absent. Gleba olivaceous becoming umber; columella absent; capillitium threads olivaceous, freely branched, pitted, continuous. Spores globose, 4 to 5 μ, pedicels acuminate, tinted; epispore olive, finely and evenly verruculose. Solitary on the ground. —Cunningham. South Australia—Pearson Island (Great Australian Bight). Victoria. New Zealand. January, February.

Characterized by the long spines of the exoperidium, and the well-developed sterile base. It closely resembles the preceding, being separated on account of the cruciate spines of the exoperidium.—Cunningham.

497. **Lycoperdon asperum** (Lev.) de Toni (L., *asper*, rough).—Peridium up to $1\frac{1}{2}$in. (3 cm.) diameter, bay-brown, globose, depressed globose or pyriform, with a well-developed rooting base; exoperidium of short, stout, pallid spines often convergent in fours at the apex, fugacious; endoperidium membranous, bay-brown, smooth, dehiscing by a small, irregularly torn, plane apical stoma; sterile base scantily developed, of small cells; diaphragm absent. Gleba pallid olivaceous; columella wanting; capillitium threads olivaceous, branched, pitted, continuous. Spores globose, 4 to 4.5 μ, pedicels acuminate, tinted; epispore pallid olive, minutely verruculose. Solitary or in small groups on the ground. —Cunningham. South Australia—Grange, Mount Lofty, Monarto South, Mount Compass, Pearson Island (Great Australian Bight). New South Wales. Victoria. Tasmania. New Guinea. Chile. South Africa. January, July to September.

Characterized by the (usually) minute sterile base and especially by the nature of the exoperidium, which is of short, stout, pallid spines often converging in fours at the apices. Plants vary considerably in the degree of the roughness of the spores and depth of the colour of the capillitium, doubtless owing to many being collected before they were properly matured.—Cunningham.

498. **Lycoperdon Gunnii** Berk. (After Ronald Campbell Gunn, 1808-1881, F.R.S., noted for his botanical researches in Tasmania, private secretary to Sir John Franklin).—Peridium $\frac{3}{8}$ to $\frac{4}{5}$in. (1 to 2 cm.) diameter, globose or subglobose, bay-brown or yellowish-brown, with a small rooting base; exoperidium at first covered with minute warts or tomentose, becoming flocculent and areolate when old; endoperidium bay-brown or yellowish, dehiscing by a small, irregularly torn, plane apical stoma: sterile base absent, or seldom scantily developed. Gleba yellowish, becoming olivaceous; columella absent; capillitium threads pallid olivaceous or lemon yellow, thin walled, sparsely branched, continuous, pitted. Spores globose, 4 to 5 μ, pedicels tinted, acuminate; epispore tinted yellow, finely verrueulose. Solitary or in small groups on the ground.—Cunningham. South Australia—Big Swamp west of Port Lincoln (probably), Murray Range east of Truro (doubtful). New South Wales. Victoria. Tasmania. May, August.

A small subglobose plant with a poorly developed rooting base, the sterile base usually being absent. The yellowish nature of the gleba, capillitium and spores, sparingly branched, flaccid capillitium, small size of the peridium, and the furfuraceous nature of the exoperidium, are the specific characters of the species.—Cunningham.

BOVISTELLA Morgan.

(Diminutive of *Bovista*.)

Plants remaining attached to the place of origin, not breaking away at maturity; with a well-developed rooting base. Peridium globose or pyriform, of two layers; an external thin, usually fugacious exoperidium, and an inner thin, flaccid, membranous endoperidium which dehisces by an apical definite or indefinite mouth. Gleba with or without a well defined sterile base; capillitium of free threads, each consisting of a thick stem and dichotomous, tapering, acuminate branches. Spores coloured, continuous, rough or smooth, globose, obovate or elliptical, pedicellate or apedicellate. Solitary on the ground.—Cunningham.

KEY TO THE SPECIES.

Spores pedicellate.
- Peridium pallid tan, finely tomentose .. .. 499. *Bovistella verrucosa.*
- Peridium dark brown, areolate .. .. 500. *B. bovistoides.*

Spores apedicellate .. .. *B. pusilla.**

* Not yet recorded for South Australia.

499. **Bovistella verrucosa** Cunn. (L., *verrucosus*, warty).—Peridium globose or shortly pyriform, up to $\frac{3}{5}$in. (15 mm.) diameter; with a strong, well-marked rooting base; exoperidium in the nature of a very delicate layer, soon more or less completely flaking away; endoperidium dingy white or pallid tan, minutely and delicately tomentose, appearing almost smooth, very thin and fragile, flaccid, opening by an apical, irregular, indefinite plane mouth. Gleba bay-brown, sterile base absent; capillitium threads of the usual type, pitted. Spores globose, 4 to 6 μ, pedicels hyaline, acuminate, up to 12 μ long; epispore tinted, finely and closely verrucose, 1.5 μ thick. Solitary on the ground.—Cunningham. South Australia—Monarto South. September.

The small size, pallid colour and tomentose nature of the endoperidium and rough pallid spores characterise this species.

500. **Bovistella bovistoides** (Cke. et Mass.) Lloyd. (*Bovista*, the genus; Gr., *eidos*, a form or sort).—Peridium globose, depressed-globose or shortly pyriform, up to $\frac{3}{4}$in. (2 cm.) diameter, with a strong rooting base which frequently attains a length of over $\frac{1}{2}$in. (1.5 cm.); exoperidium thin, white, persisting as small areolate areas over the upper part of the endoperidium, but scanty or absent from the lower part, frequently falling away completely when the endoperidium appears marked with lines arranged in an areolate manner; endoperidium flaccid, dull bay, or chestnut-brown, darker basally; mouth apical,

usually elliptical, frequently indefinite, slightly erumpent and toothed, sometimes almost plane. Gleba olivaceous, becoming umber, sterile base absent; capillitium of the usual type, threads much branched, thick-walled, pitted, dark chestnut. Spores globose, seldom obovate, 4 to 6 μ, pedicels tinted, attenuate, up to 15 μ long; epispore chestnut-brown, minutely and delicately verruculose, almost smooth, 1 μ thick. Solitary on the ground.—Cunningham. South Australia—Encounter Bay, Kangaroo Island, Flinders Range (near Port Augusta). New South Wales. New Zealand. India. May, July, August, December.

BOVISTA Dillenius.

(The German name "buff-fist" Latinised.)

Plants breaking away from the point of attachment at maturity. Peridium globose, subglobose or shortly pyriform; consisting of an outer, usually fugacious exoperidium, and a membranous, tough, firm endoperidium, which dehisces by an apical, definite or indefinite mouth. Gleba without a sterile base; capillitium of free threads, each consisting of a thick stem and dichotomous, tapering, acuminate branches. Spores coloured, continuous, rough or smooth, globose, obovate or elliptical, pedicellate or apedicellate; basidia tetrasporous. Solitary on the ground.—Cunningham.

The species of *Bovista* are known as "Tumblers" amongst the puff-balls from their habit of breaking loose from their attachment.

501. **Bovista brunnea** Berk. (L., *brunneus*, brown).—Peridium depressed globose, up to 1in. (2.5 cm.) diameter, with a minute rooting base which usually falls away at maturity; exoperidium white, evanescent: endoperidium chestnut-brown or pallid umber-brown, firm, smooth, shining. Mouth up to 2 mm diameter, irregularly circular or indefinite and irregularly torn, slightly erumpent, toothed or entire, frequently almost plane. Gleba pallid ferruginous-brown; capillitium of the usual type but more scantily branched, walls thin and pitted. Spores globose or obovate, 4 to 6 μ, pedicels tinted or hyaline, acuminate, 10 to 13 μ long; epispore pallid-ferruginous, closely and finely verruculose, 1.5 μ thick. Solitary on the ground.—Cunningham. South Australia—Beaumont, Kinchina. New Zealand. May.

This species is characterised by the firm, dark-brown, smooth and shining endoperidium, stout, sparingly branched, thin-walled capillitium, and pallid, distinctly verruculose spores.

DISCISEDA Czernaiaiev (Syn. **CATASTOMA** Morgan).

(L., *discus*, a quoit; *sedeo*, I sit.)

Peridium depressed-globose, of two layers; an exoperidium which may be thick or thin, membranous, or compact when formed of hyphae immixed with sand particles or vegetable débris, fragile, breaking away irregularly, save a small discoid or cupulate basal portion; endoperidium papyraceous or membranous, tough, variously coloured, smooth or furfuraceous, dehiscing by a definite stoma, which may be apical or basal; sterile base absent. Gleba pulverulent; capillitium of short, simple or short-branched, continuous, non-pitted coloured hyphae. Spores globose, coloured, variously roughened, pedicellate, apiculate or apedicellate. Solitary or in small groups on or in the ground.—Cunningham.

These puff-balls are usually more or less disc-shaped, the outer covering breaks away leaving a basal ring and the spores escape by a definite aperture. Australia is relatively rich in species.

KEY TO THE SPECIES.

Spores long-pedicellate (10 μ or more).
  Spores strongly verrucose, 8 to 10 μ .. .. 502. *Disciseda pedicellata.*
  Spores finely verrucose-areolate, 10 to 13 μ .. .. 503. *D. hyalothrix.*
Spores apedicellate (or apiculate, stumps only of the pedicels persisting).
  Spores almost smooth .. .. 504. *D. candida.*
  Spores finely verrucose.
    Stoma fimbriate-mammose .. .. 505. *D. cervina.*

Stoma tubular, surrounded by a depressed groove.
Spores finely verrucose-echinulate .. .. 506. *D. anomala.*
Spores covered with fine round-topped warts .. .. 507. *D. australis.*
Spores coarsely verrucose.
Spores covered with flat-topped echinulae .. 508. *D. hypogaea.*
Spores covered with coarse verrucae .. .. 509. *D. verrucosa.*

502. **Disciseda pedicellata** (Morgan) Hollos. (*Pedicellatus*, possessing pedicels or little stalks, in reference to the spores).—Peridium up to 1¼in. (3 cm.) diameter, depressed-globose or lenticular, attached by a small rooting base; exoperidium a thick sand-case, of hyphae and débris immixed, grey or brown, flaking away save a small discoid basal portion; endoperidium tough, membranous, chestnut-brown or umber, smooth, shining, dehiscing by a small apical, plane stoma. Gleba purplish, pulverulent; capillitium pallid chestnut, of the usual type. Spores globose, 8 to 10 μ diameter (including verrucae), pedicellate, pedicels up to 25 μ long, stout, tinted; epispore chestnut-brown, coarsely and strongly verrucose or verrucose-echinulate. Solitary on the ground.—Cunningham. South Australia—Fullarton, Buckland Park, Port Elliot. New South Wales. North America. South Africa. April, May, August, November.

The species is characterised by the (usually) large size, firm, leathery, umber, polished endoperidium, indefinite plane stoma, and especially by the long-pedicellate, coarsely roughened spores. The spore markings vary somewhat in different collections, in some being strongly verrucose, in others verrucose-echinulate. The length of the spines may vary from 1.5 to 0.5 μ.—Cunningham.

503. **Disciseda hyalothrix** (Cke. et Mass.) Hollos. (Gr., *hyalos*, glass, a clear transparent stone; *thrix*, a hair).—Peridium up to 1in. (2.5 cm.) diameter, depressed-globose; exoperidium in the nature of a sand-case, flaking away irregularly, save a small attached basal portion; endoperidium umber or purplish, smooth, tough, membranous, dehiscing by an irregular, plane, apical stoma. Gleba dark olivaceous, becoming dark purple, pulverulent; capillitium threads tinted, of the usual type. Spores globose, 10 to 12 μ, pedicels short, up to 15 μ, stout, tinted; epispore deep chestnut-brown, densely and finely covered with tinted or hyaline verrucae, which appear areolate in consequence of their close arrangement. Solitary on the ground.—Cunningham. South Australia—Adelaide. New South Wales. Victoria. June, July, October.

Characterised by the pedicellate, closely and densely verrucose spores. The verrucae are densely packed and somewhat irregular in shape and size, and consequently in surface view the epispore appears somewhat areolate. The plane stoma is also characteristic. The gleba may be purplish or olivaceous.—Cunningham.

504. **Disciseda candida** (Schwein.) Lloyd. (L., *candidus*, shining, white).—Peridium up to 1¼in. (3 cm.) diameter, depressed-globose; exoperidium thick, firm, of hyphae and vegetable débris immixed, breaking away circumscissilely from the base; endoperidium ferruginous to umber, tough, covered in part by a reticulate, gelatinous layer; dehiscing by a basal, fimbriate, mammose stoma. Gleba olivaceous, umber or purplish, pulverulent; capillitium threads pallid chestnut, of the usual type. Spores globose, 3.8 to 4.5 μ, with stumps only of the pedicels remaining; epispore pallid chestnut-brown, very finely verruculose, almost smooth when x 1,000 times. Solitary or in small groups in pastures; hypogaean.—Cunningham. South Australia—Between Moorilyanna and Ernabella (200 miles west of Oodnadatta), McLaren Vale? Central Australia—Near Alice Springs. New South Wales. New Zealand. Europe. North and South America. February, August, October.

Characterised by the almost smooth spores, absence of a definite pedicel, and fimbriate mammose stoma. According to Morgan the stoma is situated at the base of the plant. The gleba is olivaceous when young, deep umber when old; frequently in Australian plants identical in all other respects, it is tinged with purple.—Cunningham.

505. **Disciseda cervina** (Berk.) Cunn. (L., *cervinus*, fawn coloured).—Peridium up to more than 1½in. (4 cm.) diameter, depressed-globose; exoperidium thick, brittle, flaking away irregularly save at the base; endoperidium tough, membranous, purplish or tan coloured, furfuraceous, dehiscing by a fimbriate, mammose

stoma. Gleba olivaceous, umber or purplish; capillitium threads pallid chestnut-brown, of the usual type. Spores globose, 5.5 to 6.5 μ, with stumps only of the pedicels remaining; epispore chestnut-brown, closely and finely verruculose. Solitary in the ground; hypogaean.—Cunningham. South Australia—Grange, Monarto South, Ooldea, Ross Waterhole (Macumba). Central Australia—Macdonald Downs (160 miles north-east of Alice Springs), Dashwood Creek, near Mount Liebig. New South Wales. New Zealand. Europe. North America. January, July, August, November.

The species resembles the preceding in many characters, but may be separated by the larger and more definitely verruculose spores. The verrucae differ considerably in different collections, some being fine, approaching those of the former species (when the spore size alone separates them); others being coarse, approaching those of *D. anomala*. In such cases the nature of the stoma aids in separating the two.—Cunningham.

506. **Disciseda anomala** (Cke. et Mass.) Cunn. (Gr. *a*, not; *nomalos*, even, here in the sense anomalous).—Peridium up to $\frac{3}{4}$in. (2 cm.) diameter, depressed-globose or pulvinate; exoperidium a thin brown membrane, flaking away save at the base where persisting as a small cupulate structure, externally covered with débris; endoperidium bay-brown or umber, firm, membranous, furfuraceous, dehiscing by a raised, tubular, mammose, circular stoma which is surrounded by a depressed groove. Gleba olivaceous, becoming umber, pulverulent; capillitium threads pallid chestnut-brown, of the usual type. Spores globose, 6 to 8 μ, stumps only of the pedicels remaining; epispore pallid chestnut-brown, finely and closely verruculose. Solitary or in small groups on the ground.—Cunningham.

South Australia—Ooldea. Central Australia—Rodina, Ewaninga, Deep Well, Cockatoo Creek. New South Wales. Victoria. January, March, June to August.

Characterised by the thin and membranous exoperidium, finely verruculose spores and especially by the definite tubular stoma, surrounded by a depressed groove. The stoma is not always tubular, however, for sometimes it may be fimbriate and mammose, and in old and weathered specimens almost indefinite. Sometimes a trace of a gelatinous membrane is present lying on the surface of the endoperidium. The gleba is frequently tinged with purple in old specimens. —Cunningham.

507. **Disciseda australis** Cunn. (*Australis*, here Australian).—Peridium up to $1\frac{1}{5}$in. (3 cm.) diameter, depressed-globose, attached by a small rooting base; exoperidium thin, umber, fragile, membranous, flaking away irregularly save at the base; endoperidium furfuraceous, dehiscing by a tubular or mammose stoma, which is surrounded by a depressed groove. Gleba olivaceous, pulverulent; capillitium threads pallid chestnut-brown, of the usual type. Spores globose or subglobose, 5 to 6.5 μ, with stumps only of the pedicels persisting; epispore pallid chestnut-brown closely and finely verruculose, warts round-topped. Solitary on the ground.—Cunningham. South Australia—Mount Pleasant. Victoria. May, June.

The characters of the species are the membranous exoperidium, definite stoma of the *D. anomala* type, and the fine, closely grouped, round-topped warts covering the epispore. The plant has a general resemblance to the preceding, especially in the characters of the exoperidium and the stoma, but may be separated by the different spores, larger peridium, and darker colour of the endoperidium. —Cunningham.

508. **Disciseda hypogaea** (Cke. et Mass.) Cunn. (Gr., *hypo*, under; *gē*, the earth).—Peridium up to $\frac{3}{4}$in. (2 cm.) diameter, depressed-globose or subglobose; exoperidium membranous, very thin, pallid ochraceous, fragile, falling away irregularly save at the base; endoperidium thin, flaccid, papyraceous, furfuraceous, olivaceous, dehiscing by a minute mammose apical stoma. Gleba olivaceous, pulverulent; capillitium of the usual type, tinted. Spores globose, 8 to 9 μ (including verrucae), stumps only of the pedicels persisting; epispore chestnut-brown, closely covered with coarse flat-topped echinulae. Solitary in the ground; hypogaean.—Cunningham. Central Australia—Macdonald Downs (160 miles north-east of Alice Springs). New South Wales. May, August.

The coarse, flat-topped spines of the spores characterise the species. These are so well marked as to form a definite halo around the spores when these are viewed in median section, resembling in this particular the spores of certain species of *Geaster*. The thin and flaccid nature of the exoperidium is also characteristic.—Cunningham.

509. **Disciseda verrucosa** Cunn. (L., *verrucosus*, warty).—Peridium up to 1½in. (3 cm.) diameter, depressed-globose; exoperidium brown, tough, of hyphae and vegetable débris immixed, flaking away irregularly save a small persistent basal portion; endoperidium thick, tough, membranous, bay-brown or tinged with purple, dehiscing by an irregularly torn, toothed apical stoma. Gleba purplish, pulverulent; capillitium threads tinted, of the usual type. Spores globose, 6 to 8 μ (including verrucae), stumps only of the pedicels persisting; epispore chestnut-brown, covered with coarse hyaline verrucae, often in the form of finger-like processes. Solitary or in small groups on the ground.—Cunningham. South Australia—Beaumont, Grange, Kinchina, Flinder's Range near Port Augusta, Wilgena, Barton, Ooldea. New South Wales. New Zealand. May, June, August, November.

The species is characterised by the nature of the spores, these being covered with coarse, hyaline, finger-like processes.—Cunningham.

MYCENASTRUM Desvaux.

(Gr., *mykes*, a fungus; *astron*, a star.)

Peridium globose, obovate or pyriform, of two layers; a thin floccose exoperidium and a thick, indurate, persistent endoperidium; dehiscing in a stellate manner, or by the irregular rupture of the apical portion; sterile base absent. Gleba olivaceous, becoming umber, pulverulent; capillitium threads very abundant, of numerous short hyphae, continuous, short-branched or simple, branches beset with stout, spinous processes. Spores globose or elliptical, coloured, coarsely echinulate. Solitary, in small groups or caespitose on the ground; epigaean. —Cunningham.

510. **Mycenastrum corium** (Guersent) Desvaux. (L., *corium*, the skin, hide).—Peridium globose, subglobose, obovate or pyriform, up to 8in. (20 cm.) diameter; exoperidium tomentose, fugacious, greyish; endoperidium thick, 2 to 5 mm., smooth, polished, at first greyish, becoming bay-brown, dehiscing in a stellate manner, or by the irregular falling away of the apical portion. Gleba olivaceous, becoming umber, pulverulent; capillitium threads of the usual type. Spores globose or shortly elliptical, 11 to 13 μ, apedicellate, epispore chestnut-brown, densely echinulate, reticulate, wall 2 μ thick. Solitary, in groups or caespitose on the ground.—Cunningham. South Australia—Adelaide and Encounter Bay districts, Morphett Vale, Berri, Wilpena Pound. Central Australia—Near Alice Springs. Queensland. New South Wales—Bibbenluke, Milson Island (Hawkesbury River), etc. Western Australia. New Zealand. Probably world-wide. February, May, June, August, October.

MESOPHELLIEAE.

Peridium 3-layered, indehiscent or rupturing irregularly at the apex; capillitium copious. Spores globose or elliptical, usually with a gelatinous exospore; basidia sterigmate, apparently 2-spored.—Cunningham.

ABSTOMA G. H. Cunningham.

(*Ab.*, privative; Gr., *stoma*, a mouth.)

Peridium subglobose, of two layers; a thick fragile exoperidium composed of hyphae immixed with sand particles, breaking away irregularly; and a papyraceous or membranous, coloured endoperidium which dehisces by irregular rupture, a stoma being absent. Gleba of spores and capillitium, compact or pulverulent at maturity; capillitium threads short, occasionally branched, smooth, continuous, coloured. Spores apedicellate, globose, reticulate, coloured. Solitary or in small groups in the ground; hypogaean.—Cunningham.

The genus has not yet been recorded for South Australia. Of the two known species, *A. purpureum* (Lloyd) Cunn. occurs in New Zealand and *A. reticulatum* Cunn. was found at Forbes, New South Wales.

MESOPHELLIA Berk.

(Gr., *mesos*, middle; *phellos*, cork.)

Plant subglobose or elliptical, solitary or caespitose, dehiscing by irregular weathering of the peridium, hypogaean. Peridium usually of three well-developed layers: exoperidium firm, thick (1 to 3 mm.), brittle, exteriorly of sand, earth or vegetable débris firmly cemented together, interiorly of finely compacted fibrous tissue; central layer of loosely woven rather coarse hyphae arranged in a somewhat cellular fashion; endoperidium thin, 0.25 mm. (to 2 mm. thick in *M. castanea*), tough and parchment-like, pseudoparenchymatous, free from the exoperidium. Gleba of capillitium and spores, lying between the endoperidium and a central firm core which is held in position by trabeculae of the same tissue attached to the endoperidium; capillitium threads copiously developed, usually hyaline, septate, arranged in parellel series. Spores elliptical, smooth (or with a trace only of a gelatinous tunic), with a short, persistent basal pedicel. Hypogaean, growing solitary or caespitose, buried in sandy soils, becoming exposed by mammals or as a result of cultural operations.—Cunningham.

511. **Mesophellia arenaria** Berk. (L., *arenarius*, pertaining to sand).—Peridium subglobose or more commonly elliptical, $\frac{4}{5}$ to 2in. (2 to 5 cm.) long, by $\frac{2}{5}$ to $1\frac{1}{5}$in. (1 to 3 cm.) diameter, solitary or caespitose. Exoperidium 1 to 3 mm. thick, firm but brittle, exteriorly of sand or earth particles cemented together, interiorly of coarse fibrous tissue; endoperidium thin, 0.25 mm., dingy white or pallid bay-brown, parchment-like, tough. Gleba olivaceous, seldom ferruginous; capillitium threads hyaline or tinted only, copious, unbranched, septate; central core attached by a few coarse, flattened trabeculae, which may attain a thickness of 2 mm. or more. Spores elliptical, 7 to 12 x 4.5 to 6 μ, apex bluntly rounded, base acuminate, with a persistent stump of the pedicel, tinted, smooth (or with traces only of a gelatinous tunic).—Cunningham. South Australia—Rocky River (Kangaroo Island), Mount Compass, Willunga Hill. New South Wales—Moss Vale. Tasmania. January, February, May, June, October.

512. **Mesophellia pachythrix** Cke. et Mass. (Gr., *pachys*, thick; *thrix*, a hair).—Plants subglobose or tuberous, to $1\frac{1}{5}$in. (3 cm.) diameter. Peridial characters as in the preceding species. Central core attached to the endoperidium by very numerous, slender, thread-like trabeculae, which average from 0.1 to 0.25 mm. diameter. Gleba olivaceous, capillitium copious, threads as in the preceding species. Spores elliptical, 7 to 9.5 x 3 to 4.5 μ, apex bluntly rounded, basally acuminate, and furnished with a stump of the pedicel, tinted, smooth (or with traces of a gelatinous tunic).—Cunningham. South Australia—Near Dashwood's Gully (scratched for by rabbits ?), Blackwood Gully near Kuitpo. Victoria. Tasmania. April, October.

Differs from *M. arenaria* in the fine strands holding the central core in position.

513. **Mesophellia castanea** Lloyd. (L., *castaneus*, chestnut-coloured).—Plants subglobose or depressed globose, to $1\frac{1}{5}$in. (3 cm.) diameter. Exoperidium wanting; endoperidium 1.5 to 2 mm. thick, firm and woody, avellaneous. Gleba avellaneous; capillitium threads copious, of unbranched, septate, tinted hyphae; central core held in place by slender trabeculae composed of loosely woven fascicles of a few capillitium threads, numerous. Spores elliptical, tinted, 7 to 10 x 3 to 5.5 μ, base with stump of a pedicel, with distinct traces of a gelatinous tunic present.—Cunningham. South Australia—Aldgate.

CASTOREUM Cooke et Massee.

(L., *castor*, a beaver, a badger.)

Plant subglobose, with or without a rooting strand, hypogaean or epigaean; dehiscing by irregular rupture of the apical portion into few or many irregular lobes or laciniae. Peridium usually of three layers; a thick exoperidium of closely woven hyphae (reduced to a tenuous layer in *C. cretaceum*); a central layer of loosely woven rather coarse hyphae; and an endoperidium which is thick, tough, leathery, pseudoparenchymatous and often suberised. Gleba coloured, of capillitium and spores, but without a central core; capillitium threads hyaline, not arranged in parallel fashion, well-developed (scanty in mature plants of

C. cretaceum), septate. Spores elliptical, covered with a loose or close fitting gelatinous tunic, which gives to them an irregularly verrucose or wrinkled appearance. Growing partially or completely buried in sandy soils.—Cunningham.

KEY TO THE SPECIES.

Spores 8 to 12 μ long .. .. 514. *Castoreum radicatum.*

Spores 14 to 18 μ long.

Exoperidium well developed, 1 mm. or more thick.. *C. tasmanicum.*

Exoperidium thin, represented by a tenuous layer of hyphae attached to the endoperidium .. .. 515. *C. cretaceum.*

514. **Castoreum radicatum** Cke. et Mass. (L., *radicatus*, rooted).—Plant subglobose, to $\frac{1}{5}$in. (2 cm.) diameter, attached to the substratum by a small basal rooting strand, dehiscing by the tardy rupture of the apical portion into two or three unequal lobes. Exoperidium to 2 mm. thick, of closely woven rather coarse hyphae, externally partly covered by loosely adhering particles of earth or sand, or velutinate, bay-brown or umber-brown, internally fibrous and bay-brown; endoperidium 1 to 2 mm. thick, tough and leathery, pseudoparenchymatous, bay-brown. Gleba pallid ferruginous; capillitium threads hyaline, copiously developed, septate. Spores fusiform, 7 to 12 x 4.5 to 6 μ, both ends pointed, or the apical end acuminate, base with attached stump of a pedicel, or acuminate, covered with a coarsely and irregularly warted, close-fitting gelatinous tunic.—Cunningham. South Australia—Willunga Hill (doubtful). Victoria. Tasmania. January, February, May.

Castoreum tasmanicum Cunn. is so far only known from Tasmania.

515. **Castoreum cretaceum** (Lloyd) Cunn. (Syns., *Diploderma cretaceum* Lloyd; *D. dehiscens* Lloyd.) (L., *cretaceus*, chalky).—Peridium subglobose to shortly elliptical, $\frac{2}{5}$ to $\frac{3}{5}$in. (1 to 1.5 cm.) diameter, without a rooting strand, dehiscing by the apex becoming torn into numerous (12 to 18) upright laciniae. Exoperidium closely adherent to the endoperidium, appearing as a tenuous friable layer of loosely aggregated hyphal cells and earth particles: endoperidium 0.25 to 0.5 mm. thick, tough, woody, brittle, bay-brown or chestnut-brown, pseudoparenchymatous. Gleba pallid olivaceous; capillitium threads scantily developed, fragile, thin, septate. Spores elliptical, 13 to 16 x 5.5 to 7 μ, apex acuminate or rounded, base with a distinct persistent stump of a pedicel, covered with a coarsely verrucose, loosely fitting gelatinous tunic.—Cunningham. South Australia—Willunga Hill; on top of sandy soil in recently burnt country, Blackwood Gully near Kuitpo. Tasmania. April, August.

The method of dehiscence is characteristic, the apical part of the endoperidium becoming torn into numerous acuminate lobes which become upturned and give a peculiar castellated appearance to old specimens.—Cunningham.

GEASTREAE.

Peridium four-layered, endoperidium dehiscing by an apical stoma or by several such. Capillitium copious, attached, unbranched. Spores globose, typically echinulate; basidia 4 to 8-spored.

GEASTER Micheli.

(Gr., *gē*, the earth; *astēr*, a star.)

Peridium globose to acuminate, epigaean or hypogaean. Exoperidium of three layers, an external mycelial layer, a middle fibrillose layer, and an internal fleshy layer; at first closely investing the endoperidium, but distinct, splitting at maturity from the apex downwards into several stellate rays, which may be revolute or involute. Endoperidium pedicellate or sessile, membranous, or papyraceous, thin, glabrous or variously roughened; dehiscing by a single apical orifice, which may be peristomate or naked. Gleba of capillitium and spores; columella present or wanting; capillitium threads simple, long, apically acuminate, arising from the columella or inner wall of the endoperidium. Spores globose or subglobose, continuous, coloured, rough or smooth. Basidia sterigmate, 4 to 8-spored. Solitary, in groups, or caespitose on the ground or vegetable débris in open pastures, under hedgerows or on the forest floor.—Cunningham.

KEY TO THE SPECIES.

Mouth peristomate.
- Peristome sulcate.
  - Exoperidium not hygroscopic.
    - Endoperidium pedicellate.
      - Endoperidium smooth (or farinose, not roughened).
        - Peristome circular.
          - Base of the endoperidium smooth or striate .. .. .. 516. *Geaster pectinatus.*
          - Base of the endoperidium plicate .. .. 517. *G. plicatus.*
          - Base of the endoperidium with a collar-like ring .. *G. Bryantii.*
        - Peristome elliptical .. .. 518. *G. ellipticis.*
      - Endoperidium roughened-verrucose.
        - Peristome concolorous .. .. .. *G. Hariotii.*
        - Peristome surrounded by a silky, differently coloured zone .. .. 519. *G. Berkeleyi.*
    - Endoperidium sessile or sub-pedicellate.. *G. Hariotii.*
  - Exoperidium hygroscopic.
    - Endoperidium pedicellate.
      - Spores 6 to 8 μ .. .. 520. *G. campester.*
      - Spores 4 to 5.5 μ.
        - Endoperidium asperate .. .. .. *G. Clelandii.*
        - Endoperidium smooth .. .. .. 521. *G. Smithii.*
      - Endoperidium typically sessile .. .. 522. *G. Drummondii.*
- Peristome fibrillose.
  - Exoperidium not hygroscopic.
    - Endoperidium pedicellate.
      - Plants typically minute .. .. 523. *G. minus.*
      - Plants typically large .. .. 524. *G. limbatus.*
    - Endoperidium sessile.
      - Exoperidium externally felted-tomentose or tomentose-strigose
        - Plants large, 3 to 6 cm. .. .. 525. *G. velutinus.*
        - Plants small, 1.5 to 2 cm. .. *G. mirabilis.*
      - Exoperidium externally smooth or almost so.
        - Spores smooth or nearly so .. *G. subiculosus.*
        - Spores verruculose-echinulate or verruculose.
          - Spores 2.5 to 3.5 μ .. .. 526. *G. saccatus.*
          - Spores 4 to 5 μ .. .. 527. *G. triplex.*
          - Spores 7 to 8 μ .. .. .. 528. *G. australis.*
  - Exoperidium hygroscopic.
    - Endoperidium pedicellate .. .. 529. *G. arenarius.*
    - Endoperidium sessile .. .. *G. mammosus.*

Mouth naked.
- Exoperidium not hygroscopic.
  - Endoperidium pedicellate.
    - Exoperidium typically fornicate . .. .. 530. *G. fenestriatus.*
    - Exoperidium revolute .. .. *G. rufescens.*
  - Endoperidium sessile .. .. 531. *G. fimbriatus.*
- Exoperidium hygroscopic.
  - Spores 6 to 7 μ .. .. 532. *G. floriformis.*
  - Spores 4 to 5 μ .. .. 533. *G. simulans.*

516. **Geaster pectinatus** (Pers.) Lloyd. (L., *pectinatus*, combed).—Plants at first globose, submerged, becoming superficial and expanded when 1 to 2in. (3 to 5 cm.) across. Exoperidium split to about the middle into 5 to 12 subequal, acute rays which are expanded or sub-revolute; fleshy layer brown, unequally flaking away in irregular patches, leaving exposed the ochraceous fibrous layer; exterior covered with débris held by the adnate mycelial layer, which is persistent but tends to flake away; base concave. Endoperidium pedicellate, subglobose, depressed-globose or orceolate, $\frac{3}{5}$ to $\frac{4}{5}$in. (1 to 2 cm.) diameter, brown or lead coloured, often farinose, base tapering into the pedicel, striate or not,

apophysis present or absent; pedicel slender, 3 to 6 mm. long. Peristome sulcate, prominent, narrowly conical, concolorous. Gleba ferruginous; columella inevident; capillitium threads tinted, fusiform, simple. Spores globose, 5.4 to 6.2 μ, epispore dark umber, moderately and coarsely verrucose, reticulate. Solitary or in groups on vegetable débris on the ground.—Cunningham. South Australia —Black Hill (near Adelaide), Glen Osmond, National Park, Port Elliot, Port Lincoln. New South Wales. New Zealand. Europe. North America. May to August, December.

517. **Geaster plicatus** Berk. (L., *plicatus*, folded).—Separated from *G. pectinatus* only by the plicate base of the endoperidium. South Australia—Fullarton (Adelaide), Encounter Bay. Victoria. Tasmania. New Zealand. New Caledonia. India. Ceylon. South Africa. April, May.

Geaster Bryantii Berk. (After Charles Bryant).—Separated from *G. pectinatus* by a well-defined collar or ring around the base of the endoperidium. Recorded for the Hawkesbury River, New South Wales, but not yet for South Australia. Europe. North America.

518. **Geaster ellipticis** Cunn. (Gr., *elleipsis*, an ellipse, an oval figure).—Plants at first globose, submerged, becoming superficial and expanded when 1 to 1½in. (2 to 3 cm.) across. Exoperidium split to about the middle into 8 to 14 subequal, acute rays which are expanded or slightly involute; fleshy layer thin, more or less completely flaking away and leaving exposed the pallid tan fibrous layer; exterior covered with débris held by the adnate mycelial layer, which flakes more or less completely away; base concave. Endoperidium pedicellate, subglobose or urceolate, $\frac{2}{5}$ to $\frac{4}{5}$in. (1 to 2 cm.) diameter, brown, smooth, shining, apophysis frequently present, base smooth; pedicel short. Peristome sulcate, prominent, conical, elliptical, up to 8 mm. long, sometimes two present on the same plant, concolorous or darker. Gleba chocolate or almost black; columella wanting. Spores 4 to 6.8 μ, globose or subglobose; epispore dark-brown, moderately and coarsely verrucose, reticulate. Solitary or in groups on the ground under scrub.—Cunningham. South Australia—Pearson Island (Great Australian Bight). January.

Geaster Hariotii Lloyd has been recorded from New South Wales but not yet from South Australia.

519. **Geaster Berkeleyi** Mass. (After Reverend Miles Joseph Berkeley, the father of British mycology).—Plants at first globose, submerged, becoming superficial when expanded and $2\frac{2}{5}$ to 3½in. (6 to 9 cm.) across. Exoperidium split to about the middle into 7 to 9 unequal, acute, expanded or slightly revolute rays; fleshy layer brown, even, slightly rimose; exterior covered with débris held by the adnate, persistent mycelial layer; base concave. Endoperidium pedicellate, ovate, up to 1$\frac{2}{5}$in. (3 cm.) diameter, brown, coarsely papillate or granular; pedicel short, 3 to 5 mm. long. Peristome sulcate, prominent, conical, surrounded by a depressed, smooth, silky zone which is usually lighter in colour. Gleba umber; columella short, globose. Spores globose, 5 to 6 μ; epispore umber, acutely warted. Solitary on ground under trees.—Cunningham. South Australia. England.

520. **Geaster campester** Morgan. (L., *campester*, pertaining to a field).—Plants small, globose, at first submerged, becoming superficial and expanded when up to 1½in. (4 cm.) across. Exoperidium split to about the middle into 7 to 12 acute, equal rays which are expanded when wet, involute when dry, folding over or under the endoperidium, or sometimes revolute; fleshy layer umber, adnate, continuous or rimose; exterior covered with débris held by the closely adnate mycelial layer, becoming partly smooth; base umbilicate. Endoperidium shortly pedicellate, depressed-globose or subglobose, up to $\frac{3}{5}$in. (15 mm.) diameter, dingy-white, tan or bay-brown, finely and closely asperate. Peristome conical, acute, seated on a depressed zone, which may be absent, frequently darker in colour. Gleba umber; columella clavate, conspicuous. Spores globose, 6 to 8 μ; epispore chestnut-brown, closely and sparsely verrucose. Solitary or in groups on the ground.—Cunningham. South Australia—Hallett's Cove, Kinchina, Mannum. Hungary. North America. April, July, August.

Geaster Clelandii Lloyd occurs in Western Australia and Victoria but has not yet been found in South Australia.

521. **Geaster Smithii** Lloyd. (After Worthington G. Smith, the eminent mycologist).—Plants small, at first submerged, becoming superficial and expanded when up to 1½in. (4 cm.) across. Exoperidium split to about the middle into 8 to 9 acute, equal rays, which are expanded when wet, involute when dry, folding in under the endoperidium; fleshy layer adnate, ferruginous, continuous, farinose; exterior covered with débris held by the adnate mycelial layer; base umbilicate. Endoperidium shortly pedicellate, urceolate or pyriform, up to ⅗in. (15 mm.) diameter, pallid tan or chestnut-brown, farinose, smooth, shining, papyraceous. Peristome flattened-conical or acutely conical, seated on a depressed zone, concolorous or darker. Gleba ferruginous; columella inevident. Spores globose, 3.5 to 4.2 μ; epispore pallid ferruginous, finely and closely verruculose. Solitary on the ground.—Cunningham. South Australia—Overland Corner. New South Wales. North America. July, December.

522. **Geaster Drummondii** Berk. (After James Drummond, 1787-1863, who in 1829 accompanied Captain James Stirling to Western Australia as botanist).—Plants small, globose, at first submerged, becoming superficial and expanded when up to 2¼in. (3 cm.) across. Exoperidium split to about the middle into 8 to 10 acute, equal rays, which are expanded when wet, strongly involute when dry, folding over or under the endoperidium; fleshy layer umber, frequently farinose, adnate, continuous; exterior covered with débris held by the adnate mycelial layer, becoming partly smooth; base umbilicate. Endoperidium sessile or occasionally shortly pedicellate, globose or depressed-globose, up to ⅖in. (10 mm.) diameter, dingy white or less frequently brown, finely asperate, often becoming smooth with age. Peristome conical, acute or flattened, seated on a depressed zone, which may be wanting, frequently darker in colour. Gleba ferruginous;

[*Drawing by H. V. Justelius.*

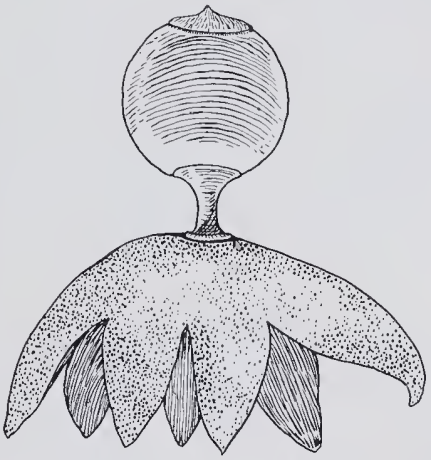
Figure 69.—*Geaster Drummondii* **Berk. (No. 522). Monarto South.**

columella inevident. Spores globose or subglobose, frequently apiculate, 4.9 to 6.5 μ; epispore ferruginous, finely and sparsely verrucose. In groups on the ground.—Cunningham. South Australia—Encounter Bay, Kinchina. Victoria. Tasmania. Western Australia—Wagin. June, August.

523. **Geaster minus** (Pers.) Cunn. (L., *minus*, less).—Plants at first globose, small, submerged, becoming erumpent and expanded when up to 2¼in. (3 cm.) across. Exoperidium split to about the middle into 4 to 8 unequal, acuminate rays, which are commonly recurved or expanded, or may become fornicate by the mycelial layer splitting free from the fibrous layer, which together with the fleshy layer becomes arched (fornicate) but remains attached by the apices of the rays to the mycelial layer, the latter remaining attached to the substratum; fleshy layer brown, rimose, frequently flaking away in patches. Endoperidium pedicellate, ⅛ to ½in. (3 to 12 mm.) diameter, obovate, elliptical or depressed-globose, variable in size and shape, pallid white, tan, or bay-brown, sometimes umber, glabrous, farinose, or coated with closely adnate glistening particles, giving to the whole a glistening appearance; pedicel up to 3 mm. long, frequently with an apical apophysis. Peristome variable, typically conical and fibrillose fimbriate, frequently silky-fibrillose, sometimes almost indefinite and plane, seated on a definite silky area outlined by a depressed groove, or indefinite when the groove is scarcely apparent or absent. Gleba ferruginous; columella inevident. Spores globose, 4.5 to 5.8 μ; epispore fuscous or umber, finely, sparsely and irregularly verrucose. Solitary, in groups or caespitose on the ground.—Cunningham. South Australia—Near Adelaide, Berri, Encounter Bay, Monarto South, Bangham (S.E.), Port Lincoln, Mount Wedge (20 miles north of Elliston), Marble Range (E.P.), Ooldea, Pearson Island (Great Australian Bight),

Wirrealpa (Flinders Range). Central Australia—Mount Liebig. Victoria. Western Australia. Tasmania. New Zealand. Europe. North America, etc. January, May to September, November. (Figure 70.)

524. **Geaster limbatus** Fr. (L., *limbatus*, fringed).—Plants at first globose, submerged, becoming superficial and expanded when 1½ to 2½in. (3 to 6 cm.) across. Exoperidium split to about the middle into 7 to 10 unequal, acute rays, which are expanded and revolute, or sometimes partially involute; fleshy layer bay-brown or ferruginous, continuous or rimose, frequently farinose; exterior covered with débris held by the persistent, adnate mycelial layer, in old specimens frequently partially flaking away; base concave or plane. Endoperidium pedicellate, depressed-globose, ovate or sub-pyriform, glabrous when old, farinose when young, grey or weathering to umber, up to ⅜in. (1.5 cm.) diameter. Peristome depressed, acute, fibrillose, surrounded by a pallid or concolorous or silky zone. Gleba chocolate; columella almost obsolete. Spores globose, 4.9



[*Drawing by H. V. Justelius.*

Figure 70.—*Geaster minus* **(Pers.) Cunn. (No. 523). X2.**

to 5.4 μ; epispore fuscous, acutely, densely and coarsely warted, opaque. In small groups on the ground.—Cunningham. South Australia—Kinchina, Murray Bridge, Pinnaroo, Mount Lofty, near Adelaide, Hallett's Cove, Encounter Bay. New South Wales. New Zealand. Europe. North America, etc. January, February, April to August, November, December.

525. **Geaster velutinus** Morgan. (L., *velutinus*, velvety).—Plants ovate, bluntly pointed, superficial, attached to the substratum by a central basal cord, becoming expanded when 1½ to 2½in. (3 to 6 cm.) across. Exoperidium saccate, split to about the middle into 5 to 8 expanded or revolute, broad, thick, sub-equal rays which when dry frequently split into two thin, fibrous and persistent layers; fleshy layer flesh-coloured, umber and rimose when dry; exterior free from débris, covered with close, brown, felted tomentum; base convex, marked with a prominent umbilical scar. Endoperidium sessile; globose or depressed-globose, up to ⅘in. (2 cm.) diameter, brown or pallid tan, minutely furfuraceous or tomentose, lower portion enclosed by the saccate base of the exoperidium. Peristome small, broadly conical, fibrillose, seated on a depressed silky zone, which may be wanting, concolorous or pallid. Gleba umber; columella cylindrical; capillitium threads occasionally branched near their apices. Spores globose, 4.1 to 4.5 μ; epispore fuscous, finely and sparsely echinulate, reticulate. Epigaean; crowded in small groups on vegetable débris or frequently on decaying wood on the forest floor.—Cunningham. South Australia—Kinchina. New South Wales. New Zealand. North America, Africa. May to July.

Geaster mirabilis Mont. and *G. subiculosus* Cke. et Mass. have been recorded from Queensland but not yet from South Australia.

526. **Geaster saccatus** Fr. (Gr., *sakkos*, a bag).—Plants superficial, ovate, pointed or umbonate, attached by a basal mycelial cord, becoming expanded when ¾ to 1¼in. (2 to 3 cm.) across. Exoperidium saccate, split to about the middle into 5 to 9 pliable, thin, expanded or revolute, equal, acute rays; fleshy layer brown, adnate, frequently rimose; exterior smooth, free from débris; base concave or plane, sometimes convex, with a prominent umbilical scar. Endoperidium sessile, up to ⅝in. (1.5 cm.) diameter, globose, glabrous, brown, partially enclosed by the saccate base of the exoperidium. Peristome fibrillose, almost plane, concolorous or pallid, even, seated on a small depressed silky zone. Gleba umber; columella indistinct. Spores globose, 2.3 to 3.7 μ; epispore umber, finely and closely verruculose, reticulate. Solitary or in small groups on the ground; epigaean.—Cunningham. South Australia—Kuitpo. New South Wales. Victoria. Tasmania. Europe. North and South America. April, July, October.

527. **Geaster triplex** Jungh. (L., *triplex*, three-fold).—Plants superficial, ovate, pointed, becoming expanded when ¾ to 5in. (2 to 12 cm.) across. Exoperidium split to about the middle into 5 to 8 equal, narrowly acuminate rays, which are expanded or revolute; fleshy layer umber, rimose, frequently partially flaking away, sometimes a small portion persisting as a small collar around the base of the endoperidium; exterior free from débris, bay-brown or tan coloured, glabrous, usually marked with numerous longitudinal striae; base plane, with a prominent umbilical scar. Endoperidium sessile, ⅕ to 1in. (0.5 to 2.5 cm.) diameter, depressed-globose or almost pulvinate, bay-brown or umber, glabrous, finely pitted or smooth, membranous. Peristome fibrillose, mammose, seated on a broad, depressed, silky, pallid zone which is usually outlined by an upraised margin. Gleba ferruginous to umber; columella clavate or indistinct. Spores globose, 4.1 to 4.9 μ; epispore almost black, finely and closely verrucose, reticulate. In groups on decaying vegetable débris; epigaean.—Cunningham. South Australia—Overland Corner. New South Wales. Victoria. Tasmania. Lord Howe Island. New Zealand. Europe. America. January, May to July, October, December.

528. **Geaster australis** Berk. (*Australis*, here Australian).—Plants superficial, at first ovate and acuminate, becoming expanded when up to 2¾in. (7 cm.) across. Exoperidium saccate, split to about the middle into 6 to 8 broad, equal, acuminate rays, which are tardily expanded or with the tips revolute; fleshy layer bay-brown or chestnut-brown, adnate, continuous when fresh, becoming rimose; exterior free or partially free from débris, ochraceous, glabrous; base plane, convex or occasionally umbilicate, marked with a prominent umbilical scar. Endoperidium sessile, up to ¾in. (2 cm.) diameter, ochraceous or tan-coloured, glabrous, smooth. Peristome fibrillose, mammose, seated on a broad, silky, slightly depressed, concolorous zone, which is occasionally outlined by a slightly raised margin. Gleba ferruginous; columella inevident. Spores globose, 7.4 to 8.3 μ; epispore tinted, finely and sparsely verrucose-echinulate. In small groups on the ground; epigaean.—Cunningham. South Australia—Adelaide, National Park, Myponga, Kinchina, Encounter Bay, Murray Bridge, Kangaroo Island. New South Wales. Victoria. Tasmania. May, August to October, December.

529. **Geaster arenarius** Lloyd. (L., *arenarius*, pertaining to sand).—This is a hygroscopic form of *G. minus*, differing only in its shorter pedicel and hygroscopic exoperidium, the rays of which when dry are folded under or over the endoperidium. Spores 4.5 to 5.8 μ.—Cunningham. South Australia—Monarto South, Wirrealpa, Ooldea. New South Wales. North America. August, September.

530. **Geaster fenestriatus** (Pers.) Cunn. (L., *fenestra*, a window).—Plants globose, at first submerged, becoming superficial and expanded when 1½ to 2½in. (3 to 6 cm.) across. Exoperidium split to about the middle into 4 to 5 rays; the outer (mycelial) layer remaining as a hollow cup in the substratum, the inner fibrous and fleshy layers becoming strongly erect (fornicate), attached at the tips to the basal cup, rays firm, thick, brown; fleshy layer brown, partly flaking away from old specimens; base strongly convex. Endoperidium pedicellate, up to 1½in. (3 cm.) diameter, depressed-globose, urnulate, with a constricted ring-like apophysis above the pedicel, ferruginous, finely pubescent. Mouth naked, conical or mammiform, tubular, apex fibrillose or lacerate. Gleba ferruginous; columella long-elliptical. Spores globose, 4.2 to 4.9 μ; epispore umber, moderately and finely verrucose, reticulate. Solitary on vegetable débris on the ground.—Cunningham. South Australia—Pearson Island (Great Australian Bight), Kinchina, Overland Corner. New South Wales—Malanganee. Western Australia—Bunbury. Europe. America, etc. January, May, August, December.

531. **Geaster fimbriatus** Fr. (L., *fimbriatus*, fringed).—Plants globose, submerged, becoming expanded when up to 1½in. (3 cm.) across. Exoperidium saccate, split to about the middle into 6 to 8 unequal, flaccid, bluntly pointed rays which are tardily expanded or with the tips only of the rays revolute; fleshy layer bay-brown or umber, continuous, adnate; exterior wholly covered with débris held by the adnate mycelial layer, which may partially flake away on weathering, base convex, plane or concave. Endoperidium sessile, ⅕ to ⅖in. (0.5 to 1 cm.) diameter, depressed-globose, dingy white to umber, glabrous, smooth. Mouth either an indeterminate aperture with a fibrous and lacerate margin, or defined by a slightly depressed concolorous or lighter zone; sometimes approaching the fibrous condition. Gleba umber; columella inevident. Spores globose, 3.3 to 4.5 μ; epispore fuscous, closely and finely verrucose, reticulate. In small groups on the ground; hypogaean.—Cunningham. South Australia—Fullarton, Kinchina, Sandergrove, Mount Dutton Bay (E.P.). New South Wales. Victoria. Tasmania. Europe. America. May, June, August, October, November.

532. **Geaster floriformis** Vittad. (L., *flos, floris*, a flower; *forma*, form, shape).—Plants at first globose, submerged, becoming superficial and expanded when ⅘ to 2½in. (2 to 6 cm.) across. Exoperidium split to about the middle into 7 to 12 subequal, narrow, acute rays which are expanded when wet, strongly involute when dry, then folding completely over (rarely under) the endoperidium; fleshy layer adnate, smooth, umber, rimose when old; exterior at first covered with débris held by the closely adnate mycelial layer, soon flaking away and leaving exposed the glabrous, ochraceous or brown fibrous layer; base strongly umbilicate. Endoperidium up to ⅗in. (1.5 cm.) diameter, sessile, depressed-globose, minutely furfuraceous, glabrous when old. Mouth naked, indefinite, conical or more frequently plane, irregularly torn and apically fibrillose in old specimens. Gleba umber; columella small, cylindrical. Spores globose or subglobose, 5.4 to 7.4 μ; epispore dark brown, closely and coarsely warted. In groups on the ground.—Cunningham. South Australia—Adelaide, Aldinga Bay, Port Elliot, Kinchina, Ooldea, near Echo Hill (200 miles west of Oodnadatta). New South Wales. Victoria. New Zealand. Europe. North America. South Africa. March, June to August, October, November.

533. **Geaster simulans** Lloyd. (L., *simulans*, resembling).—Plants globose, submerged, becoming superficial and expanded when up to 1½in. (4 cm.) across. Exoperidium split to about the middle into 7 to 8 unequal, acute rays, which are expanded when wet, involute when dry, folding over or usually under the endoperidium, sometimes drying partially expanded; fleshy layer thick, adnate, umber, rimose or continuous; exterior at first covered with débris held by the adnate mycelial layer, usually flaking away, leaving exposed the ochraceous or bay-brown fibrous layer; base strongly umbilicate. Endoperidium sessile, depressed-globose, up to ⅗in. (1.5 cm.) diameter, glabrous, ochraceous. Mouth a minute, indefinite, plane aperture, lacerate or fibrillose when old, slightly wrinkled or folded. Gleba ferruginous, columella inevident. Spores globose, 4 to 5.2 μ; epispore fuscous, finely, evenly and closely verruculose, reticulate. Solitary or in small groups on the ground.—Cunningham. South Australia—Kinchina. New South Wales. August, October.

MYRIOSTOMA Desv.

(Gr., *myrios*, countless; *stoma*, a mouth.)

Peridium subglobose; exoperidium consisting of two layers, a fibrous or mycelial layer, and a pseudoparenchymatous layer, thick, fleshy-coriaceous, splitting at maturity from the apex downwards into several star-like lobes which become reflexed; endoperidium membranaceous, then papyraceous, thin, supported on several short stems, dehiscing by many apertures or mouths. Capillitium threads simple, rarely branched, tapering at the end. Spores coloured, minutely verrucose, globose. Superficial.—Rea.

No species recorded for South Australia.

SCLERODERMATALES.

Peridium epigaean, sessile or attached by a pseudo-stem, from 1 to 3-layered; dehiscing by an apical pore or by irregular apical fissuring. Gleba at maturity pulverulent (or partially so), without capillitium. Basidia inflated, bearing in an irregular manner a variable number (1 to 12) of spores.—Cunningham.

SCLERODERMATACEAE.

Peridium of one or two layers, dehiscing by irregular apical fissuring of the apex, sessile or with a pseudo-stem. Gleba pulverulent in *Scleroderma*, semi-compact in *Pisolithus* through induration of the tramal plates. Basidia bearing from 1 to 8 spores sessilely or on short sterigmata. Spores globose, echinulate or reticulate.—Cunningham.

SCLERODERMA Persoon.

(Gr., *scleros*, hard; *derma*, the skin.)

Plants solitary or in groups, subglobose, pyriform or sub-turbinate. Peridium firm, consisting of a single layer, externally frequently broken into areolae, verrucae or scales; contracted basally into a short rooting base or pseudo-stem of compacted mycelial strands, firmly attached to the substratum by (usually) an abundant development of mycelial strands. Gleba formed of tramal plates enclosing cavities in which are produced the spores, becoming pulverulent at maturity. Spores globose, coloured, continuous, reticulate or verrucose.—Cunningham.

KEY TO THE SPECIES.

Spores strongly reticulate .. .. *Scleroderma Bovista.*
Spores echinulate or verrucose.
  Spores 6 to 10 μ, commonly 6 to 8 μ, finely and densely verruculose .. .. 534. *S. australe.*
  Spores 10 to 12 μ, sharply echinulate; peridium covered with fine, darker coloured, deciduous warts .. .. 535. *S. verrucosum.*
  Spores usually 11 to 14 μ, or larger, coarsely echinulate or verrucose.
    Peridium thin, leathery and attached by numerous mycelial strands .. .. 536. *S. flavidum.*
    Peridium thick, hard and woody, usually attached by a firm mycelial taproot .. .. 537. *S. radicans.*

Scleroderma Bovista Fr. has been recorded from New Zealand but not yet from Australia.

534. **Scleroderma australe** Mass. (*Australis*, here Australian).—Plants solitary or crowded, 1½in. or more (4 cm.) diameter, commonly much less, subglobose, pyriform or sub-turbinate, firm, basally plicate and attached by a short rooting base, or not infrequently sessile and attached by several scattered basal mycelial cords. Peridium when dry tough, tardily rupturing by irregular crevices, lobes in old and weathered plants becoming somewhat recurved and stellate; externally bright lemon-yellow, often bay-brown, areolate apically, and sometimes with smooth flattened scales of a deeper colour, or almost smooth; in section thin, 0.5 mm., yellowish. Gleba at first violaceous, becoming umber-brown; tramal plates seen usually only in young plants, yellowish. Spores globose, 6 to 10 μ (commonly 6 to 8.5 μ), finely verrucose; spines acute at apices, broad at bases and only 0.5 μ long.—Cunningham. South Australia—Mount Lofty. Queensland. New South Wales. Victoria. March, April, June, July, December.

This usually small species is characterised by the small spores, with their fine verrucae, yellowish colour, usually strongly areolate surface of the peridium and frequent attachment to the substratum by several stout cord-like rhizoids. Superficially, plants resemble *S. flavidum* in the yellowish colour, areolate upper portion of the peridum, and stellate dehiscence as shown by old and weathered plants; but differ in the much smaller, finely verrucose spores and the frequent darker colour of the surface areolae.—Cunningham.

535. **Scleroderma verrucosum** (Vaill.) Pers. (L., *verrucosus*, warty).—Plants solitary, small, to 1¾in. (4 cm.) diameter, fragile, depressed globose, not plicate below, contracting into a short stem-like rooting base which is attached to the substratum by mycelial strands. Peridium when dry fragile, lax, dehiscing by a small torn mouth, which later becomes torn and distorted, externally ochraceous or umber, sometimes with a purplish cast, typically covered with small, deciduous, raised, umber warts, more numerous and larger apically, absent near the base, which is smooth and lighter in colour; in section 0.2 to 0.5 mm.

thick, ochraceous. Gleba at first with an olivaceous tinge, becoming umber; tramal plates whitish, becoming dingy-grey, scanty. Spores globose, sometimes subglobose, 9 to 12 μ, pallid ferruginous-brown, closely and coarsely echinulate; spines with acuminate apices, narrow bases, and to 1.5 μ long. Growing solitary on the ground in sandy soil.—Cunningham. South Australia—Mount Lofty. New South Wales. Europe. Africa. Asia Minor. April to July.

This species may be recognised by its brittle, thin peridium, externally covered with darker warts, the manner of dehiscence, small but distinct rooting base, and the characteristic echinulate spores. The plant is usually smaller in Australia than in Europe, and the spores are also slightly smaller.—Cunningham.

536. **Scleroderma flavidum** Ellis et Everh. (L., *flavidus*, light yellowish).—Plants solitary or gregarious, sometimes caespitose, growing half buried until maturity, to 2in. (5 cm.) diameter, firm, pyriform or sub-turbinate, often lobed, usually plicate below, contracting into a mass of mycelial fibres, which occasionally form a conspicuous stem-like base. Peridium when dry tough, leathery and seldom brittle, to 1 mm. thick, dehiscing by irregular rupture into several lobes, which in old weathered plants frequently become recurved and stellate; pallid-straw colour, bright lemon-yellow, or tinged vinaceous, often drying dingy-brown, finely areolate above, sometimes almost smooth. Gleba at first olivaceous, becoming dingy-ferruginous or umber-brown; tramal plates often subpersistent, yellow. Spores globose, 10 to 14 μ (commonly 10 to 13 μ), coarsely and densely echinulate; spines acuminately pointed, somewhat narrow at their bases, to 1.5 μ long. Growing on sandy soil, or partially buried in clay or rock cuttings.—Cunningham. South Australia—Near Adelaide, Mount Lofty Ranges, Kuitpo, Sellick's Beach scrub, Encounter Bay, Kinchina, Overland Corner, Wilpena (Flinders Range). New South Wales—Mootwingie Gorge (60 miles north of Broken Hill). Western Australia. New Zealand. Africa. March to August, November, December.

Forma macrosporum Cunn. (Gr., *makros*, long; *spora*, a seed).—Spores larger, to 19 μ (commonly 14 to 16 μ) and with more coarse spines, which sometimes appear as fused warts. Otherwise identical with the typical form.—Cunningham. South Australia—Mount Lofty, Mount Remarkable. New South Wales. Victoria. Western Australia. Tasmania. New Zealand. February, March, May to October.

The characters of the species (typical form) are the firm, areolate, relatively thick peridium, method of dehiscence and frequent stellate appearance of old specimens, subpersistent tramal plates, and definitely echinulate spores. The form *macrosporum* appears to differ only in that the spores are larger and more coarsely warted; but as numerous intermediate forms occur it is not possible to separate it other than as a form.—Cunningham.

537. **Scleroderma radicans** Lloyd. (L., *radicans*, rooting).—Plants solitary, to 2in. (5 cm.) diameter, subglobose, obovate or subpyriform, firm, plicate below, with usually a strong compact mycelial rooting base which is not broken into fibres but forms a solidly interwoven tissue of hyphae and sand. Peridium when dry hard, firm and woody, dehiscing by irregular breaking away of the upper portion; not lobed, long indehiscent, externally furfuraceous or minutely and irregularly areolate, pallid-white, becoming ochraceous; in section to 5 mm. thick, commonly 1.5 to 2 mm., but thicker below and pallid-ochraceous. Gleba at first ferruginous, becoming umber; tramal plates white, becoming greyish, scanty and practically disappearing in old plants. Spores globose, chestnut-brown, 12 to 14 μ (up to 16 μ), densely closely verrucose-echinulate; spines acuminate at their apices, moderately broad at their bases, and (including the wall of the spore) to 2 μ long. Growing under scrub, often buried in sand.—Cunningham. South Australia—Murray River, near Overland Corner (?). New South Wales. Victoria. Western Australia.

This species is characterised by the thick, hard, and woody peridium, which basally attains a thickness of 5 mm., pallid colour, greyish, scantily developed tramal plates, and peculiar rooting base. This last consists of a dense tissue of interwoven hyphae in part mixed with sand, and is quite distinct from the fibrous rooting system of other species.—Cunningham.

PISOLITHUS Albertini et Schweinitz (**POLYSACCUM** DC.).

(Gr., *pisos*, a pea; *lithos*, a stone.)

Plant consisting of a peridium supported on a stem-like rooting base. Peridium of a single thin membranous layer, flaking away irregularly from the apex. Gleba divided into polygonal cells by the persistent tramal plates; cells filled with the spore mass, a true capillitium wanting. Spores coloured, globose, verrucose. Growing half buried in the ground in sandy soils.—Cunningham.

538. **Pisolithus tinctorius** (Micheli *ex* Pers.) Coker et Couch. (L., *tinctorius*, of dyeing, in reference to the staining quality of the juice).—Plant variable in size and shape, from 1¼ to 7½in. (3 to 18 cm.) tall, to 4in. (10 cm.) diameter, with or without a stout rooting base. Peridium a single layer, at first smooth, shining and pallid white or ochraceous, becoming brown or black, finally breaking away irregularly from the apex. Gleba divided into polygonal or lenticular chambers, which are larger above and peripherally, unequal in size and shape, dissepiments carbonous, firm but brittle; chambers occupied with the pulverulent spore mass, ranging in colour from ochraceous to umber-brown, sometimes tinted purple. Spores globose, 7 to 12 μ (commonly 7 to 9 μ); epispore thin, 0.5 μ, ferruginous, covered with densely packed spines which may attain a length of 1.5 μ.—Cunningham. South Australia—Adelaide Plains, Mount Lofty Ranges, Kuitpo, Tunkalilla, Overland Corner, Beltana, Lake Wangany (E.P.), Pearson Island (Great Australian Bight), Cordillo Downs, Pandie Pandie (on Diamantina). Central Australia—Alice Springs, Hermannsburg, Glen Helen, Cockatoo Creek, Mount Liebig. Queensland. New South Wales. Victoria. Western Australia—Roebourne. Tasmania. New Zealand. Europe. North America. Africa. East Indies. January to September, December.

539. **Pisolithus microcarpus** (Cke. et Mass.) Cunn. (Gr., *mikros*, small; *karpos*, a fruit).—Plant often with two to three peridia attached to the same well-developed rooting base, to 4in. (10 cm.) tall, 1½in. (3 cm.) diameter. Peridium pyriform, smooth or with raised areas corresponding with the glebal cavities, shining and black, this condition extending to the rooting base, which is black, woody and basally divided into numerous coarse rhizoids. Gleba ochraceous or pallid ferruginous-brown in mass, dissepiments carbonous, thin and decidedly brittle; chambers polygonal and closely compacted, less than half the size of those of *P. tinctorius*. Spores globose, 5 to 7 μ; epispore 0.5 μ thick (including verrucae), pallid ferruginous, finely and somewhat sparsely verruculose. —Cunningham. South Australia—Kalangadoo (S.E.). Queensland. New South Wales. Bass Straits. April, May, November.

Characterised by the low specific gravity of the plant, the black shining exterior of the unopened peridium and rooting base, pallid ochraceous gleba, exceedingly fragile dissepiments and small spores. The latter are finely verruculose, and not covered with the coarse spinous processes of the preceding species. —Cunningham.

CALOSTOMATACEAE.

Peridium of 3 layers, dehiscing by an apical stoma, carried at the apex of a prominent pseudo-stem. Gleba borne within a spore sac pendent from the apex of the interior of the endoperidium. Basidia bearing sessilely a variable number (5 to 12) of spores which are attached irregularly. Spores globose or elliptical, tinted or hyaline, variously sculptured.—Cunningham.

CALOSTOMA Desv. (Syn., **MITREMYCES** Nees.)

(Gr., *kalos*, beautiful; *stoma*, a mouth.)

Peridium depressed globose, seated at the apex of a prominent pseudo-stem, composed of interwoven, compacted gelatinized mycelial strands. Exoperidium of compacted gelatinized hyphae, flaking away irregularly, or in one cap-like piece; endoperidium crowned with a toothed, erumpent, usually coloured stoma; spore sac attached to the apex of the interior of the endoperidium. Gleba ochraceous or sulphur coloured, pulverulent, without a definite capillitium. Spores globose or elliptical, tinted or hyaline, with a pitted exospore which may appear reticulated. Solitary or caespitose on the ground or on decaying wood.—Cunningham.

540. **Calostoma fuscum** (Berk.) Mass. (L., *fuscus*, dark).—Exoperidium gelatinous-coriaceous, splitting circumscissilely from the endoperidium and falling away in one piece. Endoperidium to $\frac{3}{4}$in. (1.75 cm.) diameter, depressed globose or turbinate, coriaceous, tough, dark-brown, almost black, finely and closely scabrid, appearing areolate under a lens; apex crowned with a 5 to 7 (commonly 6)-rayed scarlet peristome; attached to the substratum by numerous subgelatinous rhizoids which are interwoven to form a pseudo-stem which may attain a length of $1\frac{1}{5}$ to $2\frac{2}{5}$in. (3 to 6 cm.), and a width of from $\frac{2}{5}$ to $\frac{4}{5}$in. (1 to 2 cm.). Spore sac ochraceous, pendent from the apex of the endoperidium, perforate with an orifice communicating with the endoperidium, to $\frac{3}{5}$in. (1 cm.) diameter and subglobose in fresh specimens. Spores elliptical, with rounded ends, hyaline or tinted yellow, 11 to 16 x 8 to 10 μ, epispore closely pitted, appearing reticulated, 1 to 1.5 μ thick.—Cunningham. South Australia—Mount Lofty, Second Valley Forest Reserve. Victoria. New South Wales. May, June. (Figure 71.)

[*Drawing by H. V. Justelius*

Figure 71.—*Calostoma fuscum* **(Berk.) Mass. (No. 540).**

NIDULARIALES.

Peridium sessile, cupulate, campanulate or depressed globose, from 1 to 4-layered, dehiscing by rupture of an epiphragm covering the apex, or by irregular fissuring of the wall. Gleba enclosed in one or many lenticular peridiola, which may be embedded in mucilage or attached to the peridial wall by funiculi. Capillitium absent. Basidia bearing apically 2, 4 or 8 spores. Spores hyaline, smooth, variously shaped.

NIDULARIACEAE.

Peridium from 1 to 3-layered, cupulate or subglobose, dehiscing by rupture of an apical diaphragm, or by fissuring of the wall. Gleba of numerous peridiola embedded in mucilage or attached by funiculi to the peridial wall.

NIDULARIA (Fr.) Tul.

(L., *nidulus*, a little nest.)

Peridium subglobose or depressed globose, sessile, composed of a single layer of woven hyphae; dehiscing by fissuring of the peridial wall. Peridiola numerous, lenticular, embedded in mucilage, not attached by funiculi. Basidia 4-spored. Growing scattered or in small groups on decaying wood, or on the ground on vegetable débris.—Cunningham.

No South Australian species have been recorded.

NIDULA White.

(L., *nidulus*, a little nest.)

Peridium cyathiform or cupulate, composed of a single thick and felted layer of coloured coarse hyphae; dehiscing by rupture of an apical epiphragm which is similar in structure to that of *Cyathus*. Peridiola numerous, embedded in a gelatinous matrix which fills the peridium, not attached by funiculi. Basidia 2 or 4-spored.

The genus is separated from *Nidularia* by the presence of a well-defined epiphragm; and from *Cyathus* and *Crucibulum* in that peridiola are embedded in mucilage and not attached to the wall of the peridium by funiculi.—Cunningham.

No South Australian species recorded.

CRUCIBULUM Tulasne.

(L., *crucibulus*, a crucible.)

Peridium cyathiform, sessile, composed of a single thick, felt-like membrane of closely woven, coloured hyphae; dehiscing by rupture of the well-marked epiphragm, which is formed from undifferentiated peridial tissue. Peridiola numerous, each composed of an outer thick loosely woven tunica, a thick, horny, dark-coloured cortex, and a loosely woven hymenial layer; attached to the peridial wall by a funiculus, which is simple in structure. Basidia 2 or 4-spored.

The genus contains but one species. It is separated from *Cyathus* by the single layer comprising the peridial wall; and from *Nidula* by the presence of funiculi.—Cunningham.

541. **Crucibulum vulgare** Tul. (L., *vulgaris*, common).—Peridium cyathiform, to $\frac{1}{2}$in. (12 mm.) tall, and under $\frac{1}{2}$in. (10 mm.) wide at the apex, tapering slightly to a sessile truncate base, which may attain a thickness of 8 mm., seated on a basal pad of woven hyphae; exterior bright cinnamon, becoming dingy with age, in young specimens closely covered with silky appressed tomentum, becoming almost smooth, interior pallid cinnamon, smooth, shining; margin erect or slightly expanded, even, thick, smooth. Peridiola pallid brown or dingy white, lenticular, smooth, 1.25 to 2 mm. diameter; tunica thick, dingy white, readily separable. Spores narrowly elliptical, rounded at both ends, 7 to 10 x 4 to 6 μ. Growing solitary or caespitose on decaying leaves, sticks, old sacking, manure, etc., on the ground.—Cunningham. South Australia—The Hermitage, Mount Lofty, Clarendon, Kinchina. New South Wales. Tasmania. Victoria. New Zealand. Probably world-wide. May to November.

CYATHUS Haller.

(Gr., *kyathos*, a cup.)

Peridium composed of 3 distinct layers, dehiscing by rupture of an apical epiphragm. Peridiola numerous, lenticular, dark-coloured, each composed of an external white tunica which may be thin and evanescent, a hard and horny cortex, and an inner hymenial layer; attached to the peridial wall by a complex funiculus. Basidia 2, 4 or 8-spored.—Cunningham.

542. **Cyathus stercoreus** (Schw.) de Toni. (L., *stercoreus*, of dung).—Peridium at first urceolate, becoming obconic or campanulate, $\frac{1}{5}$ to $\frac{3}{5}$in. (5 to 15 mm.) tall, 4 to 8 mm. across the apex, tapering gradually to the slender and short stipe, or sessile; exterior fawn coloured, at first hirsute, becoming almost smooth with age, interior smooth, lead coloured and shining; margin erect, slightly or not expanded, entire, even. Peridiola lenticular, 2 mm. diameter, smooth and shining, black; tunica wanting. Spores globose, 20 to 40 μ, epispore thick. Growing solitary or caespitose on manure, decaying wood, soil, etc.—Cunningham. South Australia—Fullarton (Adelaide), Mitcham, Mount Lofty, Clarendon. New South Wales. Western Australia. New Zealand. Probably world-wide. February, December.

543. **Cyathus olla** (Batsch) Pers. (L., *olla*, a pot).—Peridium at first urceolate, becoming campanulate, to $\frac{3}{8}$in. (15 mm.) tall, $\frac{1}{4}$ to $\frac{1}{2}$in. (6 to 12 mm.) wide at the apex, tapering strongly to the sessile truncate base; exterior grey-fawn, bleaching pallid yellow, clothed with fine appressed tomentum, interior smooth or somewhat concentrically zoned, dull lead colour, shining; margin strongly expanded and flaring, slightly or not recurved, entire, crenate. Peridiola lenticular, numerous, dark-brown or lead-coloured, large, 2 to 3.5 mm. diameter, smooth, or minutely rugulose when dry; tunica thin, dingy white, closely adnate. Spores obovate or elliptical, apex rounded, base bluntly pointed, 8 to 15 x 6 to 10 μ. Growing solitary or caespitose on rotting twigs, dead grass stems, etc., or on the ground. South Australia—Mount Lofty, Islington, Beaumont, near Brighton, Enfield, Narrung, Ooldea. Victoria. Tasmania. New Zealand. Probably world-wide. January to December.

SPHAEROBOLACEAE.

Peridium sessile, of 3 or 4 distinct layers; dehiscence by stellate rupture of the apex of the exoperidium, and evagination of the endoperidium. Peridiolum solitary, globose or lenticular. Basidia 4 to 6- or 8-spored.—Cunningham.

Containing the single genus *SPHAEROBOLUS*.

SPHAEROBOLUS Tode.

(Gr., *sphaira*, a ball; *bolos*, a throw.)

Peridium of 3 or 4 distinct layers: an exoperidium of two layers, the outer thick and composed of closely woven hyphae, the inner of pseudoparenchyma (wanting in one species); and an endoperidium with an outer tenuous layer of parallel hyphae and an inner palisade of densely packed prismatic cells arranged radially. Dehiscence by stellate rupture of the apex of the exoperidium, and evagination of the endoperidium, which discharges forcibly the solitary peridiolum. Peridiolum composed of a single layer of woven (or pseudoparenchymatous) hyphae, enclosing the gleba of spores embedded in mucilage. Spores hyaline, elliptical or globose, smooth, borne sessilely on the basidia.—Cunningham.

544. **Sphaerobolus stellatus** Tode (L., *stellatus*, star-shaped).—Peridium sessile, at first embedded in the mycelial weft covering the substratum, becoming somewhat erumpent, subglobose, and up to 2 mm. diameter, fleshy, externally hirsute and dingy-white, internally smooth and orange. Peridiolum globose, reddish-brown, 0.75 to 1.25 mm. diameter, lenticular when dry. Basidiospores hyaline, continuous, globose or obovate, 6 to 10 x 5 to 8 μ; epispore smooth, 2 μ thick, cell-contents granular. Crowded on decaying wood and leaves, old sacking, manure, and on the ground.—Cunningham. South Australia—On fallen pieces of stringy-bark, National Park. August.

EXOBASIDIINEAE.

EXOBASIDIALES.

Same characters as the order .. .. EXOBASIDIACEAE.

EXOBASIDIACEAE.

Mycelium vegetating in the interior of the living host and giving rise, on the exterior, to basidia .. .. *Exobasidium.*

EXOBASIDIINEAE.

Parasites.

EXOBASIDIALES.

Hymenium effused, rarely consisting of basidia only. Parasitic on leaves, etc. (especially of *Ericaceae*).

EXOBASIDIACEAE.

Same characters as the order.

EXOBASIDIUM Woronin.

(Gr., *ex*, out of; *basidium*, a basidium.)

"Mycelium vegetating in the interior of the living host, and giving rise, on the exterior, to basidia. Hymenium discontinuous. Spores white, elongate fusiform or oblong reniform, smooth, simple or septate; basidia cylindrical, with 4-5-6 sterigmata. Cystidia none. Parasitic on living leaves and stems."—Rea.

No Australian species recorded.

HETEROBASIDIAE.

In the Heterobasidiae, the basidia are longitudinally divided, transversely septate or simple and the spores produce sporidiola or secondary spores on germination and do not give rise directly to a mycelium as in the Homobasidiae.

The genera vary considerably in outward appearance. In some cases they closely resemble members of the Hydnaceae, Thelephoraceae and Clavariaceae and were included in such until a detailed microscopic examination revealed their proper position in a systematic classification. Many of them are more or less gelatinous and some are brightly coloured.

The Auriculariaceae include the Jew's Ear Fungus (*Auricularia auricula-Judae*), a tough dark-brown flexuose ear-shaped fungus occuring on old trunks in the Eastern States but not yet recorded from South Australia. It is much esteemed as a delicacy by the Chinese and at one time there was a large export trade from New Zealand in this commodity. A species of *Auricularia* occurs on rotting trunks of willow and other exotic trees in our National Park. *Septobasidium pteruloides* is a very interesting member of this family, growing as tufts of small blackish processes from galls made by a coccid on one of our species of tea-tree (*Leptospermum scoparium*).

In the Tremellaceae, we have as a common species the orange-coloured cosmopolitan *Tremella mesenterica*, forming rather brain-like gelatinous masses on fallen logs. We have one or more further species of *Tremella*, the dingy whitish *Seismosarca hydrophora* forming an effused soft gelatinous mass, and some species of the pellucid gelatinous genus *Exidia*. The Hydnum-like *Tremellodon gelatinosum*, gelatinous, sessile or substipitate, with a more-or-less developed cap showing spines on the lower surface, has not yet been found in this State. The species of *Sebacina* are mostly effused and resemble *Corticium* in external appearance.

Our species of Caloceraceae, though few in number, are many in individuals. The little orange pendent disc-shaped substipitate *Dacryomyces miltinus* is common on fence posts and fallen wood. *Heterotextus flavus*, similar but larger is abundant after heavy rains on fences and fallen logs at Mount Lofty. The small yellow awl-shaped species of *Calocera* occur as troops on rotting wood.

In determining our species belonging to these various families, I would like to express my gratitude to Professor G. W. Martin of the Department of Botany, The State University of Iowa, United States of America. His critical examination of specimens has been of the greatest assistance and I am indebted to him for various descriptions of genera and species and for his expert advice.

CLASSIFICATORY KEY TO THE HETEROBASIDIAE.

Basidia longitudinally divided, transversely septate or simple; spores producing sporidiola on germination.

AURICULARIALES.

Basidia transversely septate, cylindrical, straight or curved.

1. Parasites, with or without probasidia .. .. PUCCINIINEAE.
   COLEOSPORIINEAE.
   USTILAGINEAE.

(These are not dealt with in the present work.)

2. Saprophytes.
   (*a*) Hymenium fully exposed from the first .. .. .. AURACULARIINEAE.
   (*b*) Hymenium enclosed within a peridium .. .. .. ECCHYNINEAE.

AURICULARIINEAE.

Same characters as suborder .. .. AURACULARIACEAE.

AURICULARIACEAE.

Receptacle floccose or gelatinous-mucoid, effused. Probasidia in the form of a sac, pendent laterally, and giving rise to a basidium with three transverse partitions. Sterigmata lateral (one terminal). Spores hyaline, smooth .. .. *Saccoblastia.*

Receptacle dry, coriaceous-membranous or crustaceous, effused. Probasidia ovoid or spherical, with thickened walls, coloured, producing a hyaline basidium, straight or curved, transversely septate. Lichenoid plants, growing on living bark .. .. *Septobasidium.*

Receptacle effused, incrusting, membranaceous, soft, floccose. Hymenium smooth. Basidia more or less incurved, transversely septate; sterigmata subulate, unilateral. Spores white .. .. *Helicobasidium.*

Receptacle effused or upright, thin, waxy or gelatinous. Hymenium smooth. Basidia cylindrical, straight, transversely septate. Spores white .. .. *Platygloea.*

Receptacle dimidiate, cup-shaped, sessile, substipitate, gelatinous coriaceous, then cartilaginous. Hymenium smooth, reticulate or ribbed. Basidia cylindrical, transversely 3-septate. Spores white, cylindrical or subreniform .. .. *Auricularia.*

Receptacle erect, filiform or subclavate. Hymenium smooth. Basidia cylindrical, transversely 3-septate. Spores white .. .. *Eocronartium.*

Receptacle erect, globose, stipitate. Hymenium consisting of branched threads terminated by a basidium. Basidia short, pear-shaped, transversely 1-septate. Spores white, elliptical. Growing on dead wood .. *Stilbum.*

ECCHYNINEAE.

Same characters as suborder .. .. ECCHYNACEAE.

ECCHYNACEAE.

Peridium globose, stipitate or substipitate, thin, fugacious. Threads of gleba bearing the basidia on their lower portion, either in tufts or scattered. Basidia transversely 3-septate, bearing the spores either sessile or on very short sterigmata. Spores brown .. .. *Eechyna.*

TREMELLALES.

Basidia longitudinally cruciately divided, subglobose.

TREMELLINEAE.

Same character as the order.

Basidia catenulate*, the septa usually oblique; basidiospores sessile .. .. SIROBASIDIACEAE.

Basidia not catenulate, the septa usually longitudinal or nearly so; basidiospores borne on sterigmata at the tips of epibasidia .. .. TREMELLACEAE.

*Arranged like a chain.

SIROBASIDIACEAE.

With the characters of the family .. .. *Sirobasidium.*

TREMELLACEAE.

Receptacle foliaceous, brain-like or tubercular, gelatinous, soft, fertile over the whole surface, very rarely papillose, sometimes with an irregular nucleus formed by mineral concretions. Spores white, globose or elliptical. Growing on dead wood, rarely on the ground .. .. *Tremella.*

Like *Tremella* but spores coloured .. .. *Phaeotremella.*

Like *Tremella* but with gloeocystidia .. .. *Seismosarca.*

Receptacle erect, ear-shaped or spathulate, substipitate or sessile, gelatinous, firm. Hymenium inferior or indistinctly veined. Spores white. Growing on the ground or on rotten wood .. .. *Guepinia.*

Receptacle cupulate, discoid, foliaceous or effused, marginate, pendent, sterile on upper surface, gelatinous, soft, pellucid. Hymenium inferior, smooth, reticulately veined or foliaceous, often papillose. Spores white, allantoid. Growing on wood .. .. *Exidia.*

Receptacle dimidiate, substipitate or sessile, gelatinous. Hymenium with fertile spines or teeth. Spores white Growing on wood .. .. *Tremellodon.*

Like *Odontia* but with subgelatinous teeth and longitudinally septate basidia. Spores white. Growing on dead wood .. .. *Protodontia.*

Receptacle effused, incrusting, like *Corticium*, coriaceous, gelatinous or waxy. Hymenium smooth. Spores white. Growing on the ground or on wood .. .. *Sebacina* (*Thelephora* and *Corticium* p.p.).

Like *Sebacina* but hymenium possessing true cystidia .. *Sebacina*, Subg. *Heterochaetella.*

Like *Sebacina* but hymenium possessing gloeocystidia filled with a coloured juice .. .. *Sebacina*, subg. *Bourdotia.*

Receptacle cup-shaped or resupinate with the margin free or reflexed, membranaceous, waxy or coriaceous, soft. Hymenium smooth, rugulose or tubercular. Spores white. Growing on dead branches .. .. .. *Eichleriella* (*Hirneolina*).

TULASNELLALES.

Basidia simple, subglobose, with 2-4 very thick stout sterigmata. Spores producing sporidiola on germination.

Same characters as the order .. .. TULASNELLACEAE.

TULASNELLACEAE.

Receptacle effused, fleshy membranaceous or gelatinous, then cartilaginous. Hymenium smooth, exposed from the first. Spores white, producing sporidiola on germination; sterigmata very thick and stout. Growing on dead wood and fallen pine needles .. .. .. *Tulasnella.*

CALOCERALES.

Basidia simple, cylindrical, with two long pointed sterigmata. Spores always becoming septate on germination and producing sporidiola.

Same characters as the order .. .. CALOCERACEAE.

CALOCERACEAE.

Receptacle more or less tubercular or cup-shaped, entirely gelatinous. Hymenium smooth or plicate. Spores white, simple, septate or muriform. Growing on dead wood .. .. *Dacryomyces.*

Receptacle obliquely cupulate or lobed, firm gelatinous, more or less stipitate. Hymenium discoid or unilateral .. .. *Guepiniopsis.*

Receptacle cupulate, often becoming broadly expanded, firm gelatinous, attached by a central stalk. Cortical layer of thick-walled globose, cylindrical or bottle-shaped cells .. .. *Heterotextus.*

Receptacle cup-shaped or lobed, stipitate or substipitate, gelatinous or cartilaginous; stem firm, indurated. Hymenium smooth. Spores white, elliptic-oblong, becoming 1 to 3 septate. Growing on dead wood .. *Ditiola.*

Receptacle erumpent, convex, then plane, sessile, gelatinous or floccose. Hymenium smooth, becoming plicate. Spores yellowish, oblong, becoming 8 to 10 or more septate. Growing on dead, rarely living, wood .. .. *Femsjonia.*

Receptacle upright, cylindrical, apex globose or elongate, stipitate, gelatinous, firm. Hymenium smooth or rugosely plicate, confined to the upper portion of the receptacle. Spores white. Growing on dead wood .. *Dacryomitra.*

Receptacle upright, cylindrical, simple or branched, gelatinous-coriaceous, cartilaginous when dry. Hymenium smooth, amphigenous. Spores white. Growing on wood .. .. *Calocera.*

SYSTEMATIC DESCRIPTION OF THE SPECIES OF THE HETEROBASIDIAE.

Basidia longitudinally divided, transversely septate or simple; spores on germination producing sporidiola or a mycelium, but the former only in the case of the simple basidia.

AURICULARIALES.

Basidia transversely septate, cylindrical, straight or curved, consisting of either probasidia or normal basidia. Spores producing sporidiola or a mycelium on germination.

I. Parasites, with or without probasidia.

Pucciniineae, the Rusts
Coleosporiineae
Ustilagineae, the Smuts
} Not dealt with in this Handbook.

II. Saprophytes.

AURICULARIINEAE.

Hymenium fully exposed from the first.

AURICULARIACEAE.

Same characters as the suborder.

SACCOBLASTIA Moell.

(Gr., *sakkos,* a sac; *blastos,* a bud, shoot.)

"Receptacle floccose or gelatinous-mucoid, effused. Probasidia in the form of a sac pendent laterally, and giving rise to a basidium with three transverse partitions. Sterigmata lateral (one terminal), spores hyaline, smooth."—Bourdot and Galzin.

No species recorded for Australia.

SEPTOBASIDIUM Patouillard.

(L., *septus*, enclosed, here septate; *basidium*, the part bearing the spores.)

"Receptacle dry, coriaceous-membranous or crustaceous, effused. Trama loosely formed of coloured hyphae, rigid. Probasidia ovoid or spherical, with thickened walls, coloured, producing a hyaline basidium, usually very fugacious, straight or curved, transversely septate. Spores hyaline, fusiform, cylindrical or clavate, curved. Lichenoid plants growing on living bark."—Bourdot and Galzin.

545. **Septobasidium pteruloides** (Montag.) Pat.? (*Pteruloides*, like the genus *Pterula*).—Lloyd describes and figures this species in Mycological Notes, No. 69, July, 1923, p. 1195, figs. 2429 and 2430. The description is "black. Growing adnate as a thin pad on the branches of *Leptospermum* species (Myrtaceae), but covered with dense hydnoid processes." The species grows in association with a coccid which presumably is responsible for the elongated slightly swollen fissured galls, which underlie the fungus on the smaller branches of *Leptospermum scoparium* Forst. et f. The *Septobasidium* has not yet been traced to the body of the coccid. The fungus forms patches, up to 1 x 0.5 cm. in size, composed of slender, rigid, rugose, black pteruloid processes, slightly branched in an upright direction, the apices blunt or acute, most of the processes being erect but some being adpressed to the branchlet to form the thin pad mentioned by Lloyd. South Australia—Mount Compass, Back Valley off Inman Valley. January, November.

HELICOBASIDIUM Pat.

(Gr., *helix*, *helikos*, twisted; *basidium*, a basidium.)

"Receptacle membranaceous, soft, floccose; effused, incrusting. Hymenium smooth. Basidia cylindrical, more or less incurved, transversely 2 to 4 septate, with subulate, unilateral sterigmata. Spores white, oval or pear-shaped, smooth, producing, on germination, either sporidiola or a mycelium. Growing on humus or wood."—Rea.

No species recorded for South Australia.

PLATYGLOEA Schroeter.

(Gr., *platys*, broad; *gloia*, glue.)

"Receptacle homogeneous; waxy, gelatinous or coriaceous gelatinous; tubercular, wart-like, or consisting of spreading or erect convolute plates. Hymenium smooth, unilateral or amphigenous; basidia cylindrical, straight, palisade-like, transversely septate, with long sterigmata. Spores white, oval or elliptical, obtuse or apiculate, straight or curved: producing sporidiola on germination. Growing on dead wood."—Rea.

No species recorded for South Australia.

AURICULARIA (Bull.)

(L., *auricula*, the ear.)

"Receptacle gelatinous-coriaceous, cartilaginous when dry; dimidiate or cup-shaped, substipitate or sessile; consisting of three layers, the upper layer thin and compact, very rarely glabrous, generally tomentose with thick, cylindrical, simple, erect or decumbent hairs, the intermediate layer consisting of thin, gelatinous hyphae forming a compact tissue, and the lower layer forming the hymenium. Hymenium smooth, reticulate or ribbed, fully exposed from the first. Basidia cylindrical, transversely 3-septate, with long, thin sterigmata, and forming a firm palisade-like layer. Spores white, cylindrical, oblong or subreniform, producing sporidiola on germination. Growing on wood."—Rea.

The famous Jew's Ear fungus belongs to this genus.

546. **Auricularia** sp. (specimens not yet identified*).—Receptacles mostly ¼ to ⅜in. (6 to 18 mm.), gelatinous coriaceous, more or less cup-shaped, attached dorso-laterally by a somewhat contracted base, villous externally especially when young, externally whitish when young and when dried, becoming drab to nearly Fuscous (XLVI.) when old. Hymenium near Verona Brown (XXIX.). Spores narrow, white, 8.5 to 9.5 x 2.5 μ. South Australia—On dead willow and other dead exotic trees, National Park. April, August.

* Since identified as *Cytidia flocculenta* (Fr.) v. Hohn. et Lits. Transfer to p. 262.

EOCRONARTIUM Atkinson.

(Gr., *eos,* dawn; *cronartium,* the genus *Cronartium.*)

"Receptacle subgelatinous, tough, filamentous, erect, filiform or subulate. Hymenium smooth. Basidia cylindrical, transversely 3-septate. Spores white, continuous, producing a mycelium on germination. Growing on mosses."—Rea.

No species recorded for South Australia.

STILBUM (Tode) Juel.

(Gr., *stilbo,* I shine.)

"Receptacle erect, globose, stipitate. Hymenium consisting of branched threads terminated by a basidium. Basidia short, pear-shaped, transversely 1-septate. Spores white, elliptical. Growing on dead wood."—Rea.

No species recorded for South Australia.

ECCHYNINEAE.

Hymenium enclosed with a peridium.

ECCHYNACEAE.

Same characters as suborder.

ECCHYNA Fr.

(Gr., *ekchyno,* I pour out.)

"Peridium fibrillose, subglobose, stipitate or substipitate, thin, fugacious. Gleba threads radiating, branched, flexuose at the ends. Basidia cylindrical, straight or curved, transversely 3-septate; bearing sessile or very shortly pedicellate spores, scattered or in tufts on the lower portion of the threads. Spores fawn colour, elliptical or subglobose, smooth, producing sporidiola on germination. Growing on wood."—Rea.

No species recorded for South Australia.

TREMELLALES.

Basidia subglobose, longitudinally or vertically cruciately divided into 2-4 parts. Spores producing sporidiola or a mycelium on germination.

TREMELLINEAE.

Same characters as the order.

SIROBASIDIACEAE.

Basidia catenulate, the septa usually oblique; basidiospores sessile.

SIROBASIDIUM Lag. et Pat.

(Gr., *seira,* a chain; *basidium,* the organ bearing the spores.)

With the characters of the family.

547. **Sirobasidium sanguineum** Lag. et Pat. (L., *sanguineus,* blood-red).—"Fructification pallid or light ochraceous buff to coral or reddish-brown, gelatinous opaque, cerebriform, $\frac{2}{5}$ to $\frac{3}{5}$in. (1 to 4 cm.) in length. Basidia catenulate, in tufts, radiating, and frequently with clamp connections at the base, becoming divided into 2 to 4 cells by longitudinal, oblique or transverse septa. Basidiospores sessile, elongated-clavate to broadly fusoid, 14 to 26 x 5 to 9 μ, germinating by repetition or by budding."—Martin.

TREMELLACEAE.

Basidia not catenulate, the septa usually longitudinal or nearly so; basidiospores borne on sterigmata at the tips of epibasidia.

TREMELLA (Dill.) Fr.

(L., *tremo*, I tremble.)

"Receptacle gelatinous or waxy, soft; foliaceous, brain-like or tubercular. Hymenium spread over the whole surface, very rarely papillate. Basidia amphigenous, superficial or immersed. Conidia on the same receptacle, preceding or accompanying the spores. Spores white, rarely yellowish; globose, oval, elliptical or pyriform; smooth or punctate; producing sporidiola on germination or tufts of conidia that bud in a yeast-like manner. Hyphae filamentous, thin, gelatinous, sometimes inclosing mineral concretions which form an irregular central nucleus. Growing on wood, rarely on the ground."—Rea.

The species of *Tremella* are firm-gelatinous and often lobed so as to suggest the convolutions of the brain (cerebriform). The large orange *Tremella mesenterica* is common.

I. Foliaceous, divided up into lobes and variously twisted.

548. **Tremella frondosa** Fr. (L., *frondosus*, leafy).—"Basidiocarp large (1⅗in. (4 cm.) in extent in specimen sent, when soaked), foliose, firm gelatinous when soaked and rich brown in colour (Pecan Brown to Verona Brown of Ridgway) drying blackish brown; lobes rather thin, fertile over entire exposed surface. Basidia yellow-brown, becoming divided into four cells by longitudinal or oblique septa, each cell producing an epibasidium and spore. Basidiospores pale yellowish-brown to nearly colourless (probably ochraceous in mass), subglobose to broadly ovate, 7 to 8 x 5 to 7 μ."—Martin. South Australia—Mount Lofty. Europe, etc. July.

Professor Martin considers that this Australian plant would be considered as *Phaeotremella pseudofoliacea* Rea by that author but that apparently all gradations can be found between Rea's species and *Tremella frondosa* and *T. foliacea*.

II. Brain-like, with obtuse and twisted veins.

549. **Tremella mesenterica** (Retz.) Fr. (Gr., *mesos*, middle; *enteron*, the intestine).—"Receptacle ⅜ to 3½in. (1 to 8 cm.), variously contorted, brain-like, plicato-undulate, gyrose, pruinose with the spores, orange. Flesh gelatinous, becoming firm, tough, concolorous. Spores broadly elliptical, white, 13 to 14 x 7 to 8 μ; 'basidia 15 to 20 x 12 to 18 μ; conidia ovoid globose, 3 to 5 μ; hyphae 2 to 3 μ.'—Bourd. et Galz. Dead branches, sticks and rails."—Rea. South Australia—Capucine Orange (III.), rich apricot orange. On dead branches of almond, Beaumont; on dead parts of wild rose, Mount Lofty; Glen Osmond Road; Waterfall Gully; Belair; Encounter Bay district; Monarto South; Berri. Queensland. New South Wales. Victoria. Western Australia. Europe, etc. January, May to October.

III. Crustaceous, effused, smooth.

No South Australian species recorded.

IV. Tubercular, small, suberumpent.

No South Australian species recorded.

V. With a firm, hard nucleus.

No South Australian species recorded.

PHAEOTREMELLA Rea.

(Gr., *phaios*, dark; *tremella*, the genus *Tremella*.)

"Same characters as *Tremella* but the spores dark coloured."—Rea.

See No. 548, *Tremella frondosa*.

SEISMOSARCA Cooke, emended Martin.

(Gr., *seismos*, a shaking, the shock of an earthquake; *sarx*, *sarkos*, flesh.)

"Fructifications cerebriform or lobed, tough gelatinous, becoming soft only after prolonged soaking. Gloeocystidia abundant, filled with yellow granular material. Basidia becoming longitudinally septate, each segment producing an epibasidium. Basidiospores short cylindrical or suballantoid, germinating by repetition."—Martin.

550. **Seismosarca hydrophora** Cke. (Gr., *hydōr*, water; *phora*, that which is carried, a burden).—"Basidiocarp lobed, somewhat cerebriform, rather firm gelatinous, becoming soft upon prolonged soaking, dingy white to deep olive buff, translucent, 6in. or more in length by 1½in. broad by ¼ to ½in. high (15 x 3.7 x 0.6 to 1.2 cm.). Glococystidia abundant, in surface layer, filled with yellow granules, mostly 45 to 70 x 5 to 10 μ. Probasidia ovate with a rather long stalk, 25 to 30 x 11 to 15 μ, becoming longitudinally septate into four cells, each cell producing an epibasidium 3 to 5 μ in diameter and 30 μ or more in length. Basidiospores hyaline, oval or short cylindrical, laterally depressed or rarely suballantoid, 12 to 15 x 6.5 to 8.5 μ, germinating by repetition."—Martin. South Australia—Mount Lofty, National Park, Mount Compass. New South Wales. April, May, July, August.

GUEPINIA Fr.

(After Jean Pierre Guepin, a celebrated botanist.)

"Receptacle gelatinous, firm, erect, ear-shaped, spathulate or infundibuliform, substipitate or sessile. Hymenium inferior, smooth or indistinctly veined. Basidia ovoid, vertically cruciately divided into one or two compartments, with long sterigmata. Spores white, oblong or oval, smooth, producing sporidiola on germination. Growing on the ground or on wood."—Rea.

No species recorded for South Australia. Professor Martin points out that *Guepinia pezizaeformis* Berk., as identified by Dr. C. G. Lloyd, is probably *Dacryomyces miltinus* (see No. 556) and is certainly not a *Guepinia* though it may be a *Guepiniopsis*, a genus related to *Dacryomyces* (Calocerales).

EXIDIA Fr.

(Gr., *exidio*, I exude.)

"Receptacle gelatinous, soft, pellucid; globose or hemispherical, marginate, substipitate or sessile, sterile on the upper surface. Hymenium inferior, smooth, reticulately veined, foliaceous, even or papillose with short, sterile papillae. Basidia deeply immersed in the gelatinous hyphae and covered by a layer traversed by the sterigmata. Spores white, rarely tinged brownish; allantoid, cylindrical, or oblong; smooth, producing on germination either strongly curved or straight and rod-like sporidiola or bunches of cylindrical conidia. Growing on wood."—Rea.

551. **Exidia glandulosa** (Bull.) Fr. (L., *glandulosus*, full of glands).—"Receptacle 2 to 4in. (5 to 10 cm.), globose or lens-shaped, truncate, or pendulous, somewhat plane, undulate, blackish, cinereous, and subtomentose beneath, feeling like black crepe. Hymenium studded with conical papillae, concolorous. Flesh gelatinous, diaphanous, soft, blackish. Spores oblong or cylindrical, curved, white, 12 to 15 x 4 to 5 μ. Hyphae 1 to 3 μ, with clamp connections. Dead branches."—Rea. Western Australia—Pemberton. Europe, etc. August.

552. **Exidia nucleata** (Schwein.) Rea. (Syn., *Nematelia nucleata* Schw.) (L., *nucleatus*, having a kernel).—"Receptacle 1/12 to ⅜in. (2 to 10 mm.), tubercular, round, then pulvinate and undulato-plicate, finally effused and confluent, 4 to 5 cm., either inclosing a whitish separable core of oxalate of lime, or without a core (*Tremella hyalina* Pers.), hyaline or tinged with amethyst or lilac, then opaline and finally brick or flesh colour, date brown when dry. Spores cylindrical, more or less curved, white, 10 to 14 x 5 to 7 μ; basidia ovoid, 12 to 16 x 9 to 12 μ, with indistinct clamp connections. Rotten wood and fallen branches."—Rea. South Australia—National Park, Mount Lofty, Victor Harbour. Europe, etc. May to August.

TREMELLODON Pers.

(L., *tremo*, I tremble; Gr., *odōn*, a tooth.)

"Receptacle gelatinous, soft, dimidiate or spathulate, substipitate or sessile. Hymenium covering fertile spines or teeth. Basidia globose or ovoid, longitudinally cruciately septate. Spores white, subglobose, smooth, producing a mycelium on germination. Growing on wood."—Rea.

[552A. **Tremellodon gelatinosum** (Scop.) Pers. (L., *gelatinosus*, jelly-like).—"Receptacle 1½ to 2½in. (3 to 6 cm.), dimidiate, spathulate or fan-shaped, rounded in front, attenuated behind, sessile or substipitate, surface papillose, glaucous

fuscous or tawny brownish. Spines 2 to 4 mm. long, conical, straight, gelatinous, white or glaucous. Flesh gelatinous, transparent, thick, hyaline. Spores subglobose, multi-guttulate, white, 4 to 7 μ. Basidia globose, longitudinally septate, 14 to 18 x 10 to 12 μ, with 2 to 4 sterigmata. Edible. On stumps and on the ground.''—Rea. New South Wales—Mount Wilson (spores 7 to 10.4 μ). June. (Figure 72.)]

PROTODONTIA von Hoehn.

(Gr., *prōtos*, first; *odous, odontos*, a tooth.)

''Like the genus *Odontia* in appearance, but possessing vertically septate basidia. Growing on wood.''—Rea.

No South Australian species recorded.

[*From watercolour by Miss P. Clarke.*

Figure 72.—*Tremellodon gelatinosum* (Scop.) Pers. (No. 552a). Mount Wilson (N.S.W.).

SEBACINA Tul. (**THELEPHORA** (Ehrh.) Fr. p.p.).

(L., *sebacinus*, greasy.)

''Receptacle coriaceous, gelatinous, membranaceous, waxy, floccose or pulverulent; resupinate, effused, adnate or crustaceous, and with the habit of a *Corticium*. Hymenium smooth or papillose. Basidia longitudinally cruciately divided, close together or scattered, sometimes intermixed with the conidiophores. Spores white, cylindrical, oval, oblong, reniform or globose, smooth, producing sporidiola or bunches of conidia on germination. Growing on the ground or on wood.''—Rea.

SUBGENUS: **EUSEBACINA** Rea.

(Gr., *eu*, typical; *sebacina*, the genus *Sebacina*.)

553. **Sebacina monticola** Burt. (L., *mons*, a mountain; *colo*, to dwell in).—''Fructification at least 5 cm. long, 1.5 cm. wide, coriaceous, resupinate, cracked, dirty whitish approaching pale smoke-grey, the margin closely adnate; in section 200 to 300 μ thick, with hyphae colourless, 3 to 4 μ in diameter, ascending obliquely from substratum to surface, densely crowded together, more interwoven and little incrusted in the lower third of the fructification, but more loosely arranged and heavily incrusted in the whole upper two-thirds, terminating in incrusted paraphyses which are either simple or 2-4 branched and with the

hyphal body about 2.5 μ in diameter under the incrustation; basidia about 40 μ below the surface of the hymenium, longitudinally septate, 15 to 20 x 9 to 12 μ; spores simple, colourless, even, cylindrical, straight or curved, 9 to 10.5 x 5 to 5.5 μ.''—Burt.

A specimen from Mount Lofty, April, 1921, was identified by Prof. E. A. Burt. Fructification 5 x $\frac{1}{2}$in. (13 x 2 cm.), like a thick layer of paint, but with a greyish-yellow tinge, cracking, margin sharply defined.

SUBGENUS: **HETEROCHAETELLA** Bourd.

(Gr., *heteros*, different; *chaitē*, a hair.)

''Differs from *Eusebacina* in the hymenium possessing true cystidia.''—Rea.

No South Australian species recorded.

SUBGENUS: **BOURDOTIA** Bres.

(After L'Abbé H. Bourdot, the eminent French mycologist.)

''Receptacle waxy or pulverulent, entirely resupinate, with the habit of a *Corticium*, possessing tubular, thin-walled gloeocystidia, filled with a coloured juice, and rising perpendicularly in the hyphae.''—Rea.

554. **Sebacina (Bourdotia) megaspora** Martin (Gr., *megas*, large; *spora*, seed).—''Effused in small associated patches, each up to $\frac{3}{8}$in. (1 cm.) in extent, soft waxy, thin, somewhat cerebriform, dark greyish brown to dingy watery drab and semitranslucent when fresh, 600 to 1,000 μ thick in section, drying to a dull blackish brown film. Hyphae slender, 1.5 to 2 μ in diameter, intricately branched and anastomosing, with frequent clamp connections, immersed in a uniform gelatinous matrix. Gloeocystidia abundant, at first hyaline, then yellow and filled with granular material, subcylindrical or clavate, tortuous, relatively small, mostly 30 to 60 x 6.5 to 7 μ, and restricted to the dense brown surface layer above the probasidia. Probasidia at the first broadly ovate, then spherical, borne on slender tortuous branches and soon detached, 18 to 28 μ in diameter, finally longitudinally septate into 2 to 4 cells, each of which produces an epibasidium 50 to 90 (to 150) x 4.5 to 7 μ. Spores hyaline, cylindrical, depressed on one side, or suballantoid, with a conspicuous, blunt apiculus, 24 to 30 (to 38) x 11 to 14 (to 16) μ, germinating by repetition.''—Martin. South Australia—National Park, Mount Lofty. June, July.

EICHLERIELLA Bres.

(After Bogumil Eichler.)

''Receptacle coriaceous, waxy or membranaceous, subgelatinous, cup-shaped or plano-concave, rarely pendulous; margin free. Hymenium smooth, rugulose, or *Radulum*-like. Basidia globose-ovoid, longitudinally cruciately divided, with 2-4 sterigmata. Spores white, cylindrical or oblong, smooth, producing sporidiola on germination. Growing on wood.''—Rea.

No South Australian species recorded.

TULASNELLALES.

''Basidia subglobose, simple, with 2 to 4 very thick stout sterigmata. Spores white, producing sporidiola on germination. Hymenium fully exposed from the first.''—Rea.

TULASNELLACEAE.

Same characters as the order.

TULASNELLA Schroet.

(After L. R. and C. Tulasne, the eminent French mycologists.)

''Receptacle fleshy membranaceous or gelatinous, then cartilaginous, resupinate, effused. Hymenium smooth or plicate. Basidia globose, with 2 to 4 very thick, stout sterigmata, at first obtuse, then becoming elongated and filiform, springing from the apices or the sides of the basidia. Spores white; globose, ovoid, elliptical, pyriform or pip-shaped; smooth, producing conidia or a mycelium on germination. Growing on wood and humus.''—Rea.

No South Australian species recorded.

CALOCERALES.

"Basidia cylindrical, becoming forked with two long, pointed sterigmata. Hymenium fully exposed from the first. Spores always becoming septate on germination, and producing from each cell either one sporidiolum or a bunch of conidia."—Rea.

CALOCERACEAE.

Same characters as the order.

DACRYOMYCES Nees.

(Gr., *dakryon*, a tear; *mykes*, a fungus.)

"Receptacle gelatinous or subgelatinous, homogeneous; globose, subglobose, tuberculate, often becoming cup-shaped and sometimes flattened, sessile, rarely stipitate or substipitate. Hymenium smooth, wrinkled or folded. Basidia with two long, pointed sterigmata. Spores white or yellowish; oblong, cylindrical, ovoid, subelliptical or ovato-triangular; simple, transversely septate or muriform. Receptacles producing conidia, globose, consisting of radiating, septate, moniliform threads. Growing on wood."—Rea.

555. **Dacryomyces deliquescens** (Bull.) Duby. (L., *deliquescens*, dissolving).—"Receptacle 1/12 to ¼in. (2 to 12 mm.), somewhat round, convex, then lens-shaped, immarginate, at length twisted, sessile, sometimes stipitate and root-like, yellow or orange. Flesh gelatinous, hyaline, pale. Spores cylindrical, curved, white, 8 to 22 x 4 to 7 μ, becoming 3-septate, 'each compartment producing 1-2 ovoid sporidiola, 3 to 4 x 2 μ; basidia 20 to 45 x 3 to 5 μ; hyphae 1 to 3 μ'—Bourd. et Galz. Dead wood and fallen branches."—Rea. South Australia—Locality not noted, probably Mount Lofty Ranges. Europe, etc.

556. **Dacryomyces miltinus** Berk. (Syn., *Guepinia pezizaeformis* as identified by Lloyd.) (L., *miltus*, a sort of red colour or vermilion).—Pezizaeform, tough-gelatinous, Ochraceous Orange (XV.), occasionally when old near Yellow Ochre (XV.), when dry or drying redder near Vinaceous Rufous (XIV.), 4 to 5 mm. laterally x 2 to 3 mm., consisting of a short pruinose stem passing into a flaring trumpet-shaped or spathulate laterally compressed hymenophore with a downwards-directed, obliquely cup-shaped hymenial surface, smooth or with a few irregular rugae. The external surface of the hymenophore is less pruinose than the stem. Occasionally yellower with a short stem and a downward-directed shallow cup-shaped peziza-like smooth hymenial surface. The hymenial surface at first appears as a small concavity surrounded by a thick flat rim, later expanding more. Spores narrow, slightly curved, hyaline, 13 to 16.8 x 3.7 to 5 μ. On rotting branchlets, fence posts, etc. South Australia—Beaumont, Waterfall Gully, Mount Lofty, Second Valley, Encounter Bay. New South Wales—Milson Island (Hawkesbury River), Wombeyan Caves, Bumberry. Victoria—Brisbane Range, Ararat. April, May, July to September, November.

Specimens of this species were submitted to the late Dr. C. G. Lloyd who identified them as *Guepinia pezizaeformis* Berk. Recently other specimens were forwarded to Professor G. W. Martin who finds that the species does not belong to the Tremellaceous genus *Guepinia* and considers that it is probably the plant described (inadequately) by Berkeley as *Dacryomyces miltinus*. He considers that it should probably be placed in the genus *Guepiniopsis*.

GUEPINIOPSIS Pat.

(*Guepinia*, the genus; Gr., *opsis*, like.)

"Receptacle firm-gelatinous, more or less stipitate, obliquely cupuliform (like the cup of an acorn) or lobed; hymenium discoid or unilateral. Basidia forked; spores curved."—Bourdot and Galzin.

See No. 556 *Dacryomyces miltinus* Berk.

HETEROTEXTUS Lloyd.

(Gr., *heteros*, of other kind, different; L., *textus*, woven.)

"Basidiocarp cupulate, firm gelatinous, attached by a central stalk, but often becoming broadly expanded; cortical layer of thick-walled globose, cylindrical or bottle-shaped cells, distinct from the gelatinous tissue of the cortex."—Martin.

557. **Heterotextus flavus** Lloyd. (L., *flavus*, yellow).—Lloyd's original description (Mycological Notes, No. 67, July, 1922, p. 1151, fig. 2231) is as follows:—"Sessile, pezizaeform, 6 to 8 mm. in diameter, pale yellow, hymenium on the

concave disc. Outer surface sterile, of globose or cylindrical hyaline cells. Context of gelatinous tissue. Basidia forming a palisade surface layer, cylindrical, filled with granular matter, forked. Spores 8 x 20 μ, hyaline, curved, septate in germination. It has the colour and general appearance to the eye of *Tremella lutescens*, but differs in being pezizaeform. It is close to *Guepinia occidentalis* of our Pacific Coast excepting shape.'' Later (*loc. cit.*, No. 74, March, 1925, p. 1340, fig. 3124) he states that the colour is orange yellow, the plant is attached by a broad base and the spores are 8 to 10 x 20 to 24 μ, seven septate. Professor Martin, in examining specimens for us, finds the spores 14 to 17 x 6.5 to 7.5 μ, three to five septate, usually with one large guttule or sometimes two or more smaller ones. In addition he found numerous elongated or allantoid conidia, apparently borne by the spores in germination.

The description of fresh specimens is as follows:—Receptacle $\frac{1}{2}$ to 1in. (1.2 to 2.6 cm.), rather flabelliform or *Cyphella*-shaped, contracted above to a stout base, firm gelatinous, thick, upper surface convex, sometimes slightly rugose, Light Orange Yellow or near Orange (III.). Hymenial surface more or less concave, sometimes nearly plane, often rather irregular, a little paler and yellower than the upper surface. Spores slightly curved, sausage-shaped, white, 11.5 to 17.8 x 4 to 5.3 μ, two or several septate. South Australia—Often on fences, Mount Lofty; Williamstown. Tasmania. April to July, September.

DITIOLA Fr.

(Gr., *dis*, twice; *ioylos*, down, the first growth of the beard.)

''Receptacle gelatinous, subgelatinous, sometimes becoming horny, always firm and becoming indurated in the stem; cup-shaped, tubercular or globose, sometimes branched or lobed; stipitate or substipitate. Hymenium discoid, unilateral, smooth. Basidia cylindrical with two long sterigmata. Spores white, oblong, cylindrical or elliptic cylindrical, smooth, simple or 1-3 transversely septate. Growing on wood.''—Rea.

558. **Ditiola radicata** (Alb. et Schw.) Fr. ? (L., *radicatus*, rooted).—Receptacle firm-gelatinous, pale yellow, patellate, the surface somewhat convex and slightly cerebriform, 2 to 5 mm. broad, with a thick, fibrous, tough root immersed in the substratum. Flesh pale, subgelatinous, composed of freely branching and anastomosing, conspicuously rough-walled hyphae, 2 to 2.5 μ in diameter. Probasidia 20 to 25 x 3.5 to 4.5 μ, producing two stout epibasidia. Basidiospores allantoid, becoming 1-septate in germination, 8 to 11 x 3.5 to 4 μ. Victoria—Brisbane Range. Europe, etc. November.

Professor Martin refers this Australian collection to this species, but with some misgivings, on the basis of the patellate, nailhead-like disks with the obtuse margins, the thick rooting stem and pallid colour and pale flesh. He noted that it is not growing on coniferous wood as is usual in this species.

FEMSJONIA Fr.

(Femsjonia, belonging to Femsjo.)

''Receptacle gelatinous or floccose, heterogeneous, erumpent, convex then plane, obconic, sessile. Hymenium smooth, becoming wrinkled. Basidia cylindrical with two long pointed sterigmata. Spores yellowish, boat-shaped, simple and multiguttulate, then becoming oblong and multi-septate. Growing on wood.''—Rea.

No species recorded for South Australia.

DACRYOMITRA Tul. (DACRYOPSIS Mass.)

(Gr., *dakryon*, a tear; *mitra*, a turban.)

''Receptacle gelatinous or subgelatinous, firm, erect, cylindrical, apex globose or elongate, stipitate. Hymenium smooth or rugosely wrinkled. Basidia cylindrical with two long sterigmata. Conidiophores present or absent, accompanying or preceding the basidia. Spores white, oblong or elliptical, smooth, simple or transversely septate. Growing on wood.''—Rea.

One species has been collected in this State but has not yet been identified.

CALOCERA Fr.

(Gr., *kalos*, beautiful; *keras*, a horn.)

"Receptacle gelatinous coriaceous, cartilaginous when dry; erect, cylindrical, simple or branched. Hymenium smooth, amphigenous. Basidia with two long sterigmata. Spores white or yellow, elliptical, elliptic oblong or comma-shaped, smooth or punctate, simple, becoming septate on germination. Conidiophores rarely accompanying the basidia. Growing on wood, more rarely amongst leaves."—Rea.

These are small, tough-gelatinous, mostly orange coloured awl-like fungi common on rotting trunks.

The genus *Calocera* is divided up into three sections, branched plants, caespitose plants, and those which are simple and distinct. In our experience of Australian plants the spore measurements do not help much, being somewhat variable and all more or less like each other in size or shape. Branched species may show simple forms on the same substratum, and the simple species show a tendency to branch and sometimes may grow close together so as to be subcaespitose. The colour varies from ochraceous orange to brownish orange or dingy yellowish. Whilst typical specimens may be readily placed under one or other species, intermediate forms may be met with about which uncertainty arises.

*Branched (usually).

559. **Calocera guepinioides** Berk. (Probable syn., *C. variiformis* Lloyd.) (*Guepinioides*, like the genus *Guepinia*).—Berkeley's description of this species (*vide* Cooke's Handbook of Australian Fungi, No. 1137) is:—"Small, erumpent, variable, red brown, 1 cm. high; stem compressed, palmate above, branches few and quite obtuse." Lloyd describes *C. variiformis* (Mycological Notes, VII., 1922, page 1359, fig. 3218) as wedge shaped, pale almost white but faint yellow; spores hyaline, 12 x 6 μ, slightly curved; young forms varying much, some being broad and some narrow without any wedge shape. His figure shows a palmate slightly branched plant. Dr. Lloyd has identified specimens for us under both these names. He points out that the colour "red brown" of Berkeley is evidently that of the dried plant, not of the living. In our opinion *C. variiformis* is the same species as *C. guepinioides*.

The following is a description of specimens from Mount Lofty, July, which seem to be definitely *C. guepinioides*:—Near Ochraceous Orange (XV.), the buried base paler. Half-inch (1.2 cm.) high, the emergent part being $\frac{1}{4}$in. (6 mm.), springing from a branching, rather flattened stem from slits in rotting wood. Branches spreading laterally, rather flattened, the terminal branchlets very irregular with obtuse summits, sometimes forming broad lobes, smooth. Plants rarely simple rounded clubs or like an incisor tooth. Spores apparently faintly tinted, 15 x 5.5 μ.

The following, also from Mount Lofty, July, were identified by Lloyd as *C. variiformis*:—Dingy orange yellow or orange, 5 mm. high, simple or rather flattened with several short prongs. Spores 10.4 to 12 x 3.2 to 5 μ. Specimens from a dead *Pinus* log, Glen Osmond, May to July, identified by Lloyd as *C. guepinioides*, presented the following appearance:—Ochraceous Tawny (XV.), $\frac{1}{4}$in. (6 mm.) high, usually simple with a blunt, slightly attenuated tip, occasionally flattened or with several prongs. Spores elongated, slightly curved, 8 to 12.8 x 3.2 to 4.8 μ. Gregarious or accidentally caespitose.

In looking through a number of collections of *Calocera* from Mount Lofty and the National Park, May to August, these vary, sometimes in the same collection, from a simple awl-shape with a subacute or blunt apex to flattened and branched forms. Most are about 5 to 7 mm. high, 0.75 to 1 mm. thick. The base is nearly always abrupt. The colour varies from orange to a dull or dingy yellow. If *C. variiformis* is a good species, the dingy yellow forms would seem referrable to this but there seems to be no other point of distinction.

560. **Calocera fusca** Lloyd (L., *fuscus*, brown).—Lloyd's description (Mycological Notes, VII., 1922, pages 1357 and 1359, figs. 3199 and 3215) states that the plants are simple, gregarious, gelatinous unbranched clubs about 2 cm. high (in the New Zealand specimens), brown rather than yellow or brown with darker tips, spores hyaline, slightly curved, 2-guttulated, 10 to 12 x 5 to 6 μ. One collection was from New Zealand, the other from Kendall in New South Wales.

The following from Mount Lofty, July, agrees with this description, save that there is a tendency to branch:—Near Buckthorn Brown (XV.). Usually slightly club-shaped, $\frac{3}{8}$in. (10 mm.) high, sometimes simple and rounded but often rather irregular, ends obtuse, sometimes slightly flattened, sometimes showing a tendency to branch at the ends in irregular blunt knobs. Spores pear-shaped, slightly curved, 9 to 11 x 4.5 μ. Another collection from Mount Lofty, also in July, on fences, simple or occasionally flattened, varies in colour from Buckthorn Brown (XV.) to Yellow Ochre (XV.), spores 7.5 to 9 x 3.8 to 4.5 μ.

It seems probable therefore that *C. fusca* is only a colour form of *C. guepinioides* with simple clubs.

**Caespitose.

No true caespitose species has been found in South Australia.

***Simple.

561. **C. cuneata** Lloyd. (L., cuneatus, wedge-shaped).—This is described from Tasmania (Mycological Notes, VII., 1922, page 1152, fig. 2240) as gregarious on decorticated wood, yellow, obtuse, cuneate, flattened, tapering at the base, 2 to 3 mm tall, 2 mm. broad. The following, also from Mount Lofty, July, may be this form which seems likely again to be a variant of *C. guepinioides*, or possibly it may be *C. glossoides* Fr. described in Cooke as, "simple, solitary, somewhat tremelloid, yellow, 12 mm. high, clubs incrassated, obtuse, compressed, stem tapering. Spores ellipsoid, 12 μ long." Near Ochraceous Tawny (XV.) but rather dingy. Clubs simple, $\frac{1}{8}$ to under $\frac{1}{4}$in. (3 to 6 mm.) high, tongue-shaped or like an incisor tooth, more rarely narrow club-shaped, definitely but slightly constricted at the base, smooth. Spores elongated club-shaped, 11 to 13, occasionally 15 x 4 to 5 μ.

562. **Calocera stricta** Fr. (L., *strictus*, rigid).—Dull pale orange, 1 cm. or more high, simple, gradually attenuated to an acute apex, base slightly swollen and villose. Spores pear-shaped, oblique, 9 x 4 μ. South Australia—In *Pinus radiata* Don. (*P. insignis* Dougl.) forest, Mount Burr (S.E.). May.

These plants differ from simple forms of *C. guepinioides* in being longer and all simple, with more acute apices, and with the base slightly swollen and villous. Though a septum in the spore has not been noticed, as in British specimens, the plants seem referrable to *C. stricta*. A collection from Caroline State Forest, Mount Gambier, May, a locality not far distant from the preceding, are similar, except that they lack the slightly swollen villous base which is abrupt, and though usually simple the plants are sometimes flattened; they are dull yellowish, up to $\frac{1}{4}$in. (6 mm.) high, awl-like tapering to subacute at the apex, spores 7 to 8.5 x 4 μ. These latter may be simple forms of *C. variiformis*.

[Whilst in the press, a further report received from Professor Martin necessitates the following alterations and additions under **Calocerales**:—

No. 556. **Dacryomyces miltinus**. Transfer to **Heterotextus** as **H. pezizaeformis** (Berk.) Lloyd.

Dacryomitra (p. 336). The species mentioned has been identified and should appear as:—554A. **Dacryomitra glossoides** Bref.—"Fructification clear yellow, capitate, the head gelatinous, at first globose, becoming convoluted and ridged, eventually prostrate. Stem firm, subcylindrical, fibrous gelatinous, tough, erect or more or less immersed in the substratum. Hymenium covering all parts of the head; basidia clavate, becoming furcate. Spores allantoid, becoming 4-celled, 15 x 6 μ."—Martin. South Australia—On bark of living *Eucalyptus*, Crafers. August.]

ASCOMYCETES.

In the Ascomycetes, the typical spores are contained in little sacs or asci, in the majority of cases each ascus containing eight spores. In some species secondary forms of reproduction occur in the shape of conidia. Many of the species are relatively small and a number are parasitic and play an important part in vegetable pathology. Only a few of the larger species with fruiting bodies more or less resembling some of the Basidiomycetes come within the scope of this Handbook. Even these are treated more or less incidentally and a considerable number of forms coming under *Peziza* and related genera in the Discomycetes, which have been collected and might quite well have been included, must await identification at the hands of some one interested in this group.

In the Tuberaceae, the ascophore is irregularly globose, usually large, indehiscent and usually subterranean. No species have been recognised in South Australia. Cooke in his "Handbook of Australian Fungi" records only two genera each with one species for Australia, "*Mylitta australis*" being the sclerotium of *Polyporus mylittae*.

In the Discomycetes the ascophore is more or less fleshy, often large and bright coloured and the hymenium is fully exposed at maturity. As the beech is not indigenous in South Australia, the famous *Cyttaria Gunnii*, parasitic on these trees in Tasmania, is not found here. Two species of the edible morels (*Morchella*) have been found but are rare; they are said to be delicious. These are large plants with ovate or conical caps bearing longitudinal and transverse ribs on the outside and widely hollow within; the colour is a dingy yellow to brown and the stems are stout, pallid and also widely hollow. *Leotia lubrica* is a quaint-looking fungus, with a greenish-yellow somewhat knobby and subgelatinous cap, which has been found once at Mount Lofty. One species at least of *Geoglossum* occurs in this State; the plants are small blackish elongated often compressed and rugose clubs, with a more or less defined stem, and their name of "Earth Tongue" is an appropriate one. In the Pezizae, the fruiting body is usually cup-shaped or disc-shaped and fleshy; species often occur on the ground and sometimes on manure and several of our species are brightly coloured red or orange. No work on these forms has been done in South Australia.

In the Pyrenomycetes, the fruiting body is often conspicuous and frequently carbonaceous. No species of the remarkable genus *Cordyceps* growing from the buried bodies of insect larvae or pupae, seems to have been recorded for South Australia. *Poronia* grows on horse-dung as little pallid discs dotted with black ostiola and with a stem-like base, often quite short. *Daldinia concentrica*, a blackish sphaeroid or hemispherical, carbonaceous mass growing on fallen wood, shows concentric markings on being broken open and is soon covered with a soot-like mass of extruded spores. *Xylaria* forms erect carbonaceous clavate structures; one or two species occur but have not been identified. *Nummularia* probably occurs and is similarly carbonaceous, blackish and orbicular or coin-shaped.

DISCOMYCETEAE.

"Fleshy, waxy or coriaceous fungi, with a variously shaped receptacle; hymenium ascigerous, from the first, or soon open."—Cooke.

MORCHELLA Dill.

(From the Italian *morella*.)

"Stipitate or subsessile. Pileus globose or ovate, adnate throughout its length to the sides of the stem, remaining closed at the apex, hollow and continuous with the cavity of the stem; externally furnished with stout, branched and anastomosing ribs or plates, every part bearing the hymenium. Stem stout, stuffed or hollow. Asci cylindrical, 2-4-8-spored; spores 1-seriate, continuous, hyaline, elliptical; paraphyses septate, clavate. Growing on the ground in the spring."—Massee.

This genus comprises the edible morels which, though livid in colour, are said to be excellent eating and are sold regularly in the markets in Italy. There is difficulty in identifying our species. *M. semilibera* DC., recorded by Cooke (No. 1356) for Victoria and New South Wales, has the capitulum free below the middle, the other species having it adnate to the stem. *M. crassipes*

Pers. and *M. esculenta* Pers. have the pits on the capitulum irregular in shape, not much if at all longer than broad, *M. crassipes* differing in having the stout stem much longer than the pileus. *M. elata* Fr. and *M. conica* Pers. have more or less parallel longitudinal ribs connected by slender transverse bars so as to give rise to elongated cells; in *M. elata*, the plants are large (pileus 2 to 3in., 5 to 7 cm.; stem 2½ to 3¼in., 6 to 8 cm.), the longitudinal ribs rarely bifurcate or anastomose, and the stem is lacunose and furfuraceous; in *M. conica*, *of* which *M. deliciosa* Fr. may be a form, the plants are smaller (pileus 1½ to 3in., 4 to 7 cm.; stem ⅜ to 1¼in., 1.5 to 3 cm.), the stem usually shorter than the cap, the irregular longitudinal ribs often fork and anastomose, and the stem is minutely villose and not furfuraceous.

563. **Morchella conica** Pers. (L., *conicus*, conical).—Pileus ⅝ to 1½in. (1.5 to 3.7 cm.), 1¼in. (3.1 cm.) wide, broadly conical, vertical ribs with irregular cross-bars, the cells up to ¼in. (6 mm.) diameter, cells paler than Saccardo's Umber (XXIX.), the edges of the bars much darker. Stem 1½ to 3in. (3.7 to 7.5 cm.), 1in. (2.5 cm.) thick, markedly hollow, granular, waxy yellow (Light Buff, XV.). Asci 165 x 18 μ; spores oval, 22.5 to 25 x 12.5 to 15 μ. South Australia—Mount Lofty, near Mylor. Europe, etc. September, October.

[*Photo. by Professor T. G. B. Osborn.*

Figure 73.—*Morchella deliciosa* **Fr. (See under No. 563). Gorge near Port Germein. Slightly reduced.**

The following which Dr. C. G. Lloyd diagnosed as "*M. deliciosa*, if not the young of some other species," is probably *M. conica*, of which *M. deliciosa* Fr. seems a form. Dr. Lloyd gives figures of *M. deliciosa* and other species in Mycological Notes, No. 70, September 1923, figures 2507 to 2512. Total height up to 2½in. (6.2 cm.) or more. Pileus 1¾in. (4.3 cm.), conical, 1in. (2.5 cm.) broad below the middle, slightly contracted below, gradually tapering to the apex, apex somewhat acute, adnate below or with a slight sulcus, Chaetura Drab (XLVI.), primary ribs irregularly parallel, more or less branching and anastomosing, secondary ribs irregularly transverse, sometimes as folds, sometimes as partitions, giving rise to numerous small irregular fossae, about ⅛in. (3.5 mm.) in diameter, between the longitudinal folds. Stem ¾in. (1.8 cm.), short, ½in. (1.2 cm.) thick at the base, slightly contracted above, pruinose, white. Flesh up to ¼in. (6 mm.) thick. Asci about 190 x 16 μ; spores elliptical, white, 12.5 x 6.3 μ (? immature). Amongst grass, Gorge near Port Germein. August. (Figure 73.)

564. **Morchella elata** Fr. (L., *elatus*, tall).—Pileus 3in. (7.5 cm.), 2½in. (6.2 cm.) wide at the base, conical, uniformly diminishing to a slightly blunt apex, lower border adnate, longitudinal ribs almost blackish brown, 2 to 3 mm. high, slightly irregular, sometimes rugose or furrowed, connected by transverse

or oblique cross-bars of similar appearance, the cells 2 to 5 or even 9 mm. long, dingy buff, appearing hoary when old, the smaller more or less quadrilateral, the larger elongated, sometimes with irregular subsidiary folds and elevations. Stem 4½in. (11.2 cm.), 2½in. (6.2 cm.) thick above, 2in. (5 cm.) in the middle, 1½in. (3.7 cm.) near the base, faintly and irregularly rugose, surface dull, dingy pinkish buff, very hollow to the apex of the pileus, wall 2 mm. thick, inner surface finely granular, base of stem a little rounded, the lowermost ¾in. (1.8 cm.) deeply fenestrated with several irregular openings into the cavity of the stem, the bars of these openings puckered together at the centre of the base of the stem. Spores 19 x 13 μ. South Australia—Brown Hill Creek, Myponga, Port Lincoln. Europe. September, October.

LEOTIA Hill.

"Ascophore stipitate, substance fleshy, soft and somewhat gelatinous. Pileus orbicular, spreading; margin drooping or incurved, free from the stem; glabrous, hymenium entirely covering the upper surface. Stem central, elongated. Asci

[*From watercolour by Miss P. Clarke.*

Figure 74.—*Leotia lubrica* Pers. **(No. 565).** Sydney.

cylindric-clavate, apex narrowed, 8-spored; spores hyaline, continuous or 1-septate, elongated and narrowly elliptical, obliquely 1 to 2 seriate; paraphyses present." —Massee.

565. **Leotia lubrica** Pers. (L., *lubricus*, slippery).—Pileus up to 1in. (2.5 cm.), irregularly hemispherical, often knobby or gyrose, margin thick, infolded, somewhat gelatinous, near Medal Bronze (IV.) (yellowish olive green to olive green). Stem up to 3½in. (8.7 cm.), slender or moderately stout, sometimes flattened or inflated, often bent or twisted, hollow, near Yellow Ochre (XV.) (dingy yellowish). Spores slightly curved, 15 to 19 x 4 to 5 μ. Gregarious to subcaespitose. South Australia—Amongst leaves under trees, Mount Lofty. New South Wales. Victoria. Tasmania. Europe, etc. June. (Figure 74.)

GEOGLOSSUM Pers.

(Gr., *gē*, the earth; L., *glossa*, the tongue.)

"Entire fungus more or less clavate, erect, the apical, thickened portion everywhere covered with the hymenium; glabrous or hairy, often viscid. Asci clavate, apex narrowed, 8-spored; spores elongated, arranged in a parallel fascicle, cylindrical or very slightly thickened above the middle, and inclined to become cylindric-clavate, brown, septate, usually slightly curved; paraphyses septate, brown at the tips, often longer than the asci. Growing on the ground, among grass, etc."—Massee.

The species of *Geoglossum* are small club-shaped yellow, olive-buff or black plants 1in. or more high. In some the fertile distal portion may be expanded and flattened so as to resemble a narrow elongated tongue, and hence the name. Dr. C. G. Lloyd, in "The Geoglossaceae," 1916, divides the species into two sections, those not black when fresh and those that are black. The Australian species so far collected and recorded seem all to belong to the black section. Lloyd divides the black section into (i.) viscid species, (ii.) not viscid, smooth or merely clammy, and (iii.) hirsute species. *G. capitatum* Pers., a hairy species with a capitate club, has been identified for us by Dr. Lloyd from Sydney, May. He has also identified *G. glabrum* Pers., a smooth non-viscid species, from Neutral Bay, Sydney, June. Only two collections have been made in South Australia which seem referable to *G. glabrum* and *G. nigritum* Fr., which latter is perhaps a form of *G. glabrum*.

566. **Geoglossum glabrum** Pers. (L., *glaber*, smooth).—Plant up to $1\frac{3}{4}$ to $2\frac{1}{2}$in. (4.3 to 6.2 cm.) high, black, distal $\frac{1}{2}$ to $\frac{3}{4}$in. (1.2 to 1.8 cm.) club-shaped, sometimes flattened, occasionally slightly fluted, nearly smooth, up to 5 mm. thick. Stem up to 3 mm. thick, finely granular. Flesh black. Asci slightly curved, 140 x 18 μ; spores narrow, 5 to 11 septate (usually), 3.7 x 5.5 μ; paraphyses septate, filiform, the ends bent and a little thickened (club-shaped), moniliform with four constrictions. South Australia—In sand, Back Valley off Inman Valley. August.

[*From watercolour by Miss J. Buxton.*

Figure 75.—*Peziza vesiculosa* Bull. (No. 568). On dung, Beaumont, near Adelaide.

567. **Geoglossum nigritum** Fr. (L., *nigritia*, blackness).—Plant up to 1in. (2.5 cm.) high, club-shaped (narrowly or broadly so, sometimes flattened or flabelliform club-shaped), more or less longitudinally rugose, the stem passing imperceptibly into the club, in one instance branching from the base into three. Asci club-shaped, 260 x 15 μ; spores narrow, ends pointed, dark-brown, 7-septate, 45 to 48 x 4 to 4.5 μ; paraphyses club-shaped, bent at the end, septate. South Australia—In sandy soil, Hope Valley near Adelaide. September.

PEZIZA Dill.

(L., *peziza*, a kind of fungus.)

"Ascophore sessile, but sometimes narrowed to a short, stem-like base, fleshy and brittle, closed at first, then expanding until cup-shaped, saucer-shaped, or in some species quite plane or even convex; disc even, nodulose, or veined; externally warted, scurfy, or rarely almost glabrous; cortical cells irregularly polygonal. Asci cylindrical, 8-spored, spores obliquely 1-seriate, continuous, hyaline (rarely tinged brown), elliptical, epispore smooth or rough; paraphyses present. Growing on the ground."—Massee.

568. **Peziza vesiculosa** Bull. (L., *vesicula*, a little bladder).—"Clustered, often distorted from mutual pressure, sessile but more or less narrowed at the base, globose and closed at first, then expanding but the margin usually remaining more or less incurved and somewhat notched; disc pale brown, externally brownish and coarsely granular from the presence of minute irregular warts, $1\frac{1}{4}$in. to $2\frac{1}{2}$in. (3 to 7 cm.) across. Excipulum parenchymatous, cells irregularly polygonal,

large, especially those forming the central zone, external cells brownish, growing out into small warts. Asci cylindrical, 8-spored; spores obliquely 1-seriate, smooth, hyaline, continuous, elliptical, ends obtuse, 21 to 24 x 11 to 12 μ; paraphyses slender, septate, clavate. On rich soil, manure heaps, rotten leaves, etc.''—Massee. South Australia—On dung, Beaumont, Glen Osmond, Kinchina. Victoria. Europe, etc. July, August. (Figure 75.)

This is a large dung-inhabiting species, deeply cup-shaped with the edge remaining more or less incurved, the external surface brown and more or less granular.

PYRENOMYCETEAE Fr.

''Perithecia fleshy, coriaceous, carbonaceous or membranaceous, wholly enclosing the hymenium, usually pierced at the apex.''—Cooke.

CORDYCEPS Fr.

''Stroma stipitate, erect, growing on insects or fungi, clavate; perithecia immersed in the stroma, or semi-immersed, or nearly free; asci 8-spored; sporidia filiform, soon breaking up into joints, hyaline.''—Cooke.

These are the so called ''Vegetable Caterpillars'' growing from the buried larvae or pupae of various insects. The stem, bearing the fruiting portion, may be many inches long, and emerges from the ground in which the insect host is buried. Species doubtless occur in South Australia but so far none seem to have been recorded.

XYLARIA Hill.

(Gr., *xylon*, wood.)

''Stroma erect, clavate or subglobose, often stipitate. Perithecia immersed in the stroma or adnate, carbonaceous, papillate. Sporidia ovoid, amygdaloid or navicular, continuous, brown.''—Cooke.

Several species have been collected in South Australia, as at Back Valley, off Inman Valley, but so far none have been identified.

PORONIA Willd.

''Stroma fleshy-coriaceous, at first clavate, then cup-shaped, stipitate or nearly sessile, whitish or blackish; perithecia immersed in the upper discoid face of the stroma, carbonaceous, black; sporidia continuous, brown.''—Cooke.

569. **Poronia punctata** L. (L., *punctatus*, dotted).—''Stroma erect, simple, at first clavate, soon open, cup-shaped, attenuated into a more or less long tomentose stem, externally black, disc white, punctate with black ostiola; asci cylindrical; sporidia ovate, becoming black, involved in a hyaline mucus, 18 to 26 x 10 to 14 μ.''—Cooke. South Australia—On horse dung, Mount Lofty, Eagle-on-the-Hill (spores 30 x 17.8 μ), Encounter Bay, Berri. Victoria. Tasmania. Western Australia. January, May, July, September.

A species not uncommon on horse dung with a small white disc punctate with the black ostiola, fixed in the dung by a usually short stem.

DALDINIA De Not.

''Stroma superficial, subsphaeroid, with a black, carbonaceous cortex, fibrous within, concentrically zoned; asci cylindrical; sporidia ovoid or oblong, brown; perithecia wholly immersed in the stroma, not protuberant; ostiola umbilicate.''—Cooke.

570. **Daldinia concentrica** Bolt. (L., *concentricus*, concentric).—''Stroma $\frac{1}{2}$ to 2in. (2 to 5 cm.), sphaeroid or subsphaeroid or hemispherical, rarely obovoid, internally zoned with concentric strata, black or brown, turning black. Perithecia obovoid, angular by pressure, ostiola small, punctiform. Asci cylindrical, 80 to 110 x 8 to 10 μ; sporidia ellipsoid, often unequal-sided, brown, 12 to 15 x 7 to 10 μ.''—Cooke. South Australia—Mount Lofty, Telegraph line to Cape Borda (K.I.), Myponga, Back Valley off Inman Valley (spores 24 to 28 x 11 to 13 μ). Queensland. New South Wales. Victoria. Tasmania. Western Australia. March to May, October.

Recognizable by the shape, the black colour, the escape on drying of the powdery black spores, and the laminated structure on section.

MYXOMYCETES (MYCETOZOA).

In the Myxomycetes or Mycetozoa we have forms of life which possess some of the features of animal forms, hence the name of Mycetozoa, and some of these of the fungi (and so the term Myxomycetes). The spores on germinating form amoeboid bodies, which then assume a flagellate form, change to amoebulae, and after further division unite in pairs to form zygotes. The zygotes grow into a plasmodium which is feebly motile, advancing over the substratum with a creeping movement in search of food. Finally when the nourishment is exhausted or maturity has been reached, the non-motile sporangium or fruiting body develops, which may be sessile or stalked, and if the latter is often elaborately and delicately formed and of great artistic beauty.

South Australia is not rich in species, at any rate in the case of the larger forms. Collections have been sent to Miss A. Lister and the species here recorded are from her determinations. The descriptions are taken from "A Monograph of the Mycetozoa" by Arthur Lister, F.R.S., F.L.S., Third Edition, revised by Gulielma Lister, F.L.S.

CLASSIFICATION.

Subclass I.—EXOSPOREAE.*

Spores developed outside a sporophore.

Family 1. **Ceratiomyxaceae.**—Sporophores membranous, branched; spores white, borne singly on filiform stalks arising from the areolated sporophore.

Subclass II.—ENDOSPOREAE.

Spores developed inside a sporangium.

Order I. AMAUROSPORALES.—Spores violet-brown or purplish-grey, rarely ferruginous or colourless.

Suborder I. CALCARINEAE.—Sporangia provided with lime (calcium carbonate).

Family 1. **Physaraceae.**—Lime in the form of minute round granules (sometimes in rounded nodules or absent in *Diachea*).

Family 2. **Didymiaceae.**—Lime in crystals deposited outside the sporangium-wall, rarely scanty or none.

Suborder II. AMAUROCHAETINEAE.—Sporangia without lime.

Family 1. **Collodermaceae.**—Sporangium distinct, sessile, with an outer gelatinous wall.

Family 2. **Stemonitaceae.**—Sporangia distinct, provided usually with a stalk and columella.

Family 3. **Amaurochaetaceae.**—Sporangia combined to form an aethalium.

Order II. LAMPROSPORALES.—Spores variously coloured, not violet brown or purplish-grey (except in *Licea minima* and *Listerella*).

Suborder I. ANEMINEAE.—Capillitium wanting, or if present not forming a system of uniform threads (except in *Alwisia*).

Family 1. **Heterodermaceae.**—Sporangium-wall membranous, beset with microscopic round plasmodic granules, and (except in *Lindbladia*) forming a net in the upper part.

Family 2. **Liceaceae.**—Sporangia solitary; sporangium-wall cartilaginous or membranous.

Family 3. **Tubulinaceae.**—Sporangium-wall membranous, without plasmodic granules; sporangia clustered, cylindrical or ellipsoid.

Family 4. **Reticulariaceae.**—Sporangia closely compacted and usually forming an aethalium; sporangium-walls incomplete or forming a spurious capillitium; true capillitium none, or in *Liceopsis* consisting of a few branching threads or strands.

Family 5. **Lycogalaceae.**—Sporangia forming an aethalium; pseudo-capillitium consisting of branched colourless tubes.

Suborder II. CALONEMINEAE.—Capillitium present as a system of uniform or sculptured threads.

Family 1. **Trichiaceae.**—Capillitium consisting of tubular threads, which are either free and usually unbranched ("elaters") or form a network branching at wide angles, with thickenings in the form of spirals or rings.

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* This Key is taken from Lister's "A Monograph on the Mycetozon."

Family 2. **Arcyriaceae.**—Capillitium a network of tubular threads branching at wide angles, smooth or thickened with cogs, half rings (rings in *Arcyria annulifera*), spines, or warts (capillitium often scanty and of free threads in *Perichaena corticalis* and *P. quadrata*).

Family 3. **Margaritaceae.**—Capillitium consisting of solid threads, either coiled and hair-like or nearly straight and attached to the sporangium-wall, simple or branching at acute angles.

FAMILY **PHYSARACEAE.**

"Deposits of lime in minute round granules more or less aggregated, included in the sporangium-wall and in vesicular expansions of the capillitium (lime-knots), except in *Diderma* and *Physarina* where there are no lime-knots, and in *Diachea*, in which the lime is confined to the stalk and columella and is sometimes in the form of rounded nodules. In this family and also in *Didymiaceae*, the stalk of the sporangium is developed as an open tube, through which protoplasm passes to form the young swelling sporangium; later, the walls of the stalk contract in folds, often enclosing refuse matter."—Lister.

BADHAMIA Berkeley.

(After Rev. C. D. Badham, M.D., 1806-1857, the Mycologist.)

"Sporangia stalked, sessile, or forming plasmodiocarps. Sporangium-wall single, with included lime granules. Capillitium consisting of a coarse network charged with granules of lime (sometimes constricted here and there into narrow hyaline threads). Spores clustered or free, warted, reticulated, or nearly smooth."—Lister.

571. **Badhamia foliicola** Lister (L., *folium*, a leaf; *colo*, I inhabit).—"Plasmodium orange. Sporangia subglobose, 0.5 to 1 mm. diameter, iridescent-grey, sessile and crowded, or standing singly on slender pale yellowish-brown stalks 0.2 to 0.5 mm. long. Capillitium a network of slender strands with white lime-deposits. Spores free, sometimes showing a slight tendency to adhere in loose clusters, violet brown, minutely spinulose, 8 to 11 μ."—Lister. South Australia—Bright orange yellow when immature, turning dark grey, on grass, twigs, etc., Mount Lofty. June.

PHYSARUM Pers.

(Gr., *physa*, a bubble, from the appearance of the sporangium.)

"Sporangia stalked, sessile or forming plasmodiocarps. Sporangium-wall either single, or consisting of two more or less separable layers, with deposits of minute rounded lime-granules distributed in loose or dense clusters or compacted into a crust. Stalk membranous, tubular (except in *P. penetrale* in which the stalk is solid and translucent), wrinkled with longitudinal folds, either translucent, or opaque with deposits of lime or refuse matter in the wall-substance or in the cavity of the tube. Capillitium forming a network of hyaline threads with vesicular expansions containing calcareous deposits (lime-knots), occasionally, in weak forms, without such deposits."—Lister.

572. **Physarum compressum** Alb. et Schw. (L., *compressus*, compressed).—"Plasmodium white. Total height 1 to 1.5 mm. Sporangia reniform or obovoid, compressed, erect, splitting along the ridge, stalked, sessile or forming plasmodiocarps, scattered, clustered or confluent, white or grey, rugose or closely spotted with white; sporangium-wall membranous, colourless or purplish below, including dense clusters of white lime-granules. Stalk stout, furrowed, black from contained refuse matter, or brownish or white from deposits of lime in the wall. Capillitium a close network with numerous rounded white lime-knots, varying in shape and size, and connected by rather short hyaline threads. Spores dark purplish brown, more or less spinulose or echinulate, 9 to 14 μ diameter. On dead leaves, twigs, straw, etc."—Lister. South Australia.—Recorded (Miss Lister).

FULIGO Haller.

(L., *fuligo*, soot.)

"Sporangia elongated, branching and interwoven, combined to form a pulvinate aethalium, the outer layer of sporangia often barren and forming a cortex charged with deposits of lime-granules and without spores. Capillitium with few or many lime-knots."—Lister.

573. **Fuligo septica** Gmelin. (Gr., *septikos*, decaying).—"Plasmodium yellow, rarely white. Aethalia pulvinate, varying much in size, from 2 mm. to 20 cm. broad, yellow. The sporangia constituting the aethalium are intricately coiled and anastomosing, 2 to 2.5 mm. broad, with air spaces in the intervals which permeate the mass; cortex yellow, thick, thin or wanting, when the surface is greenish-grey and marked with brain-like coils of the perfect sporangia; sporangium walls within the aethalium membranous, very fragile, colourless with scattered deposits of lime-granules. Columella none. Capillitium scanty or abundant, consisting of a loose network of slender hyaline threads more or less expanded at the axils, with fusiform or branching yellow lime-knots, varying much in size. Spores violet, almost smooth, 6 to 8 μ, rarely 8 to 10 μ."—Lister. South Australia—On dead pine stump, Beaumont (more lemon-coloured than crocus); on dead pine stump, Glen Osmond, National Park, Kuitpo, Myponga. Queensland. New South Wales. Flinders Island (Bass Straits). Western Australia. February to May, August, November, December.

This is the well-known and widely distributed "Flowers of Tan," so called from its frequent occurrence on spent tan in tan-yards. It forms more or less disc-shaped brittle and friable masses an inch or more in extent on dead wood, leaves, etc., at first yellow, soon fading to whitish, presenting a vinous-grey appearance from the spores when broken in two. The white form, var. *candida* Fr., also occurs with us.

574. **Fuligo cinerea** Morg. (L., *cinereus*, ashy).—"Plasmodium white. Aethalia pulvinate, elongate, simple or branched, 4 to 60 mm. long, scattered or gregarious, formed of closely interwoven sporangia usually enclosed in a smooth white cortex densely charged with lime, seated on a white hypothallus. Sporangium-walls within the aethalium more or less perfect, membranous, with deposits of white lime-granules. Capillitium consisting of simple or branched hyaline threads, and large white lime-knots that may unite to form a pseudo-columella, or almost *Badhamia*-like. Spores brownish-violet, spinulose, ellipsoid, 13 to 17 x 8 to 12 μ, or subglobose, 9 to 12 μ. On dead leaves, straw, etc."—Lister. South Australia—On the ground, Beaumont. New South Wales. March, April.

A widely distributed usually small, scattered or gregarious species.

FAMILY **DIDYMIACEAE.**

"Deposits of lime in the form of crystals or crystalline discs distributed over the sporangium-wall; capillitium without lime-knots (except in *Didymium anomalum*); sporangia simple, except in *Mucilago* when they are combined into an aethalium."—Lister.

DIDYMIUM Schrader.

(Gr., *didymos*, double.)

"Sporangia stalked, sessile or forming plasmodiocarps; sporangium-wall membranous or cartilaginous, with superficial crystals of lime either scattered over the surface or combined into a separable crust. Capillitium of branching threads, which are often thickened at intervals with dark calyciform nodes, in normal developments without lime-knots; in *D. anomalum* consisting of simple tubes containing lime crystals."—Lister.

575. **Didymium nigripes** Fr. (L., *niger*, black; *pes*, a foot) near var. *xanthopus* Lister (Gr., *xanthos*, yellow; *pous*, a foot).—"Plasmodium grey or colourless. Total height 1 to 1.5 mm. Sporangia gregarious, hemispherical, umbilicate beneath, stalked, erect, 0.5 to 0.7 mm. diameter, white; sporangium-wall, membranous, mottled with brown or colourless, clothed with stellate crystals of lime. Stalk cylindrical, two or three times the height of the sporangium, longitudinally striate, varying in colour from dark olive to orange-brown, translucent, not containing refuse matter. Columella subglobose, dark brown, filled with irregular angular crystals of lime. Capillitium of delicate colourless or purplish-brown branching threads. Spores pale violet-brown, nearly smooth, 8 to 11 μ diameter. Var. *xanthopus*—Stalk orange, columella white."—Lister. South Australia—Recorded (Lister). New South Wales. Victoria.

A small orange-stalked species.

FAMILY **STEMONITACEAE.**

"Sporangia stalked; sporangium-wall a delicate membrane, often evanescent; stalk solid, at least in the upper part, extending within the sporangium as a columella from which the branching threads of the capillitium take their origin. In this family the more or less solid stalk is developed within the young rising sporangium."—Lister.

STEMONITIS Gleditsch.

(Gr., *stēmōn*, a thread.)

"Sporangia cylindrical, stalked, fasciculate; the solid black stalk extending within the sporangium to near the apex as a columella (except in confluent forms). Capillitium formed of numerous threads radiating from all parts of the columella and combined into a loose network, the ultimate branches united into a surface net (this is often incomplete in irregular developments)."—Lister.

576. **Stemonitis splendens** Rost. (L., *splendens*, beautiful).—"Plasmodium creamy-white. Total height 6 to 20 mm. Sporangia cylindrical, obtuse, stalked, purplish-brown, closely fasciculate and forming large colonies. Stalk black, shining, slender, 1 to 4 mm. long, rising from a well-developed silvery or purplish hypothallus. Columella reaching to near the apex of the sporangium, rigid. Capillitium of purplish-brown threads, the principal branches springing at different intervals from the columella, at first almost simple, suddenly branching to form a smooth surface net with rounded variously shaped meshes 20 to 70 μ wide. Spores pale reddish-purple, faintly and closely warted, 7 to 9 μ."—Lister. South Australia—On pine stump, Glen Osmond. New South Wales. Tasmania. April, May, November.

A beautiful little species growing in tufts on dead wood with short black stems and longer cylindrical purplish-brown sporangia.

FAMILY **RETICULARIACEAE.**

"Sporangia closely compacted and usually forming an aethalium. Sporangium-walls without plasmodic granules, usually incomplete, perforated, or forming a spurious capillitium; true capillitium none, or in *Liceopsis* consisting of a few branching threads and strands."—Lister.

DICTYDIAETHALIUM Rost.

(Gr., *dictydion*, a little net; *aethalium*, the term for a compound fructification.)

"Aethalium pulvinate, formed of erect columnar sporangia. Sporangium-walls incomplete, dome-shaped at the apex, continued down to the basal membrane in four to six straight threads. Capillitium none."—Lister.

577. **Dictydiaethalium plumbeum** Rost. (L., *plumbeus*, lead-coloured).—"Plasmodium rose-red. Aethalium pulvinate, smooth, flattened, 1 to 5 cm. broad, 0.5 to 1 mm. thick, dull slate-coloured or clay-coloured, iridescent, areolated with the convex apices of the sporangia, often surrounded by a white membranous hypothallus; sporangia cylindrical, angled by mutual pressure, 0.5 to 1 mm. high, 0.2 mm. broad; sporangium-wall ochraceous or yellow, persistent and forming a flat or dome-shaped cap at the apex, sometimes dark with superficial deposits of refuse-matter, continued down to the basal membrane in four to six straight threads 2 to 4 μ thick and triangular in section, evanescent between the threads. Spores clay-coloured in mass, when magnified pale yellow, spinulose, 9 to 12 μ."—Lister. South Australia—Plasmodium Light Coral-Red (XIII.) turning Carnelian Red (XIV.), Mount Lofty, National Park. June, September.

RETICULARIA Bull.

(L., *reticulum*, a little net.)

"Aethalium composed of numerous elongated interwoven sporangia, whose walls are partly evanescent, partly persistent, and form broad expansions and strands dividing above into delicate capillitium-like threads. Spores and threads rusty brown."—Lister.

578. **Reticularia Lycoperdon** Bull. (After *Lycoperdon*, a genus of Puff-balls).—"Plasmodium creamy-white. Aethalium pulvinate or subglobose, 5 mm. to 6 cm. diameter, brownish copper-coloured or enclosed in a thin smooth silvery cortex, seated on a well-developed hypothallus of interwoven membranous strands. Pseudo-capillitium consisting of persistent portions of the sporangium-walls, forming irregular branching strands arising from the hypothallus, dividing above into numerous slender flattened and flexuose rusty-brown threads. Spores free or adhering loosely in large clusters, somewhat turbinate, rusty-brown, thickened and closely reticulated on the rounded side, the remaining part marked and scattered with warts, 6 to 10 μ. On dead wood."—Lister. South Australia—Beaumont near Adelaide. New South Wales. March, May.

Forming small silvery or brownish copper-coloured subglobose or somewhat flattened discs suggesting a puff-ball.

FAMILY **LYCOGALACEAE**.

"Sporangia forming an aethalium; pseudo-capillitium consisting of smooth or wrinkled branching colourless tubes."—Lister.

LYCOGALA Adanson.

(Gr., *lykos*, a wolf; *gala*, milk.)

"Aethalium subglobose or conical, with a cortex consisting of two or more closely combined layers of different structure; the outer layer has large cell-like vesicles, which are either embedded or superficial, and is traversed by interlacing tubular threads which pierce the homogeneous inner layer, and are continuous with the tubes of the pseudo-capillitium; the latter are grey or colourless, wrinkled or nearly smooth."—Lister.

579. **Lycogala epidendrum** Fr. (Gr., *epi*, on; *dendron*, a tree).—"Plasmodium coral-red, rarely white, cream-coloured or yellow. Aethalia crowded or scattered, subglobose, sessile, 3 to 15 mm., pinkish-grey, yellowish-brown, red-brown or nearly black, minutely warted; cortex varying in thickness, minutely warted, with irregular superficial vesicles. Pseudo-capillitium arising from the inner side of the cortex in the form of loosely branching and anastomosing thin-walled tubes, varying from 3 to 20 μ diameter, usually marked with close transverse wrinkles; free branches numerous, clavate or rounded at the ends. Mass of spores pinkish-grey or pink, becoming ochraceous with age; spores almost colourless, loosely reticulated over the greater part of the surface, the remaining part marked with a loose reticulation or with short raised lines and warts, 4 to 7 μ. On dead wood."—Lister. Recorded from New South Wales and probably occurs in this State.

This species suggests a wood-inhabiting species of *Lycoperdon* (puff-ball), for which it may be mistaken.

ADDITIONS TO PART I.

ENTOLOMA (Page 93).

580. **Entoloma rhodopolium** Fr. (Gr., *rhodon*, a rose; *polios*, grey).—Pileus 1¼ to 3½in. (3 to 8.7 cm.), slightly convex becoming nearly plane or irregular with a small umbo, moist, smooth becoming subfibrillose, sometimes splitting, paler than Buffy Brown (XL.). Gills slightly sinuate, moderately close, up to 8 mm. deep, greyish pink when young, then near Vinaceous Buff and Avellaneous (XL.). Stem 1¾in. (4.3 cm.), slightly attenuated downwards, subfibrillose, hollow, white perhaps with a slight greyish tint. Flesh white, very thin. Smell rather strong. Hyphae large; basidia large, club-shaped; spores angular (polygonal), tinted, 9 x 7.5 μ. South Australia—Under hawthorn (*Crataegus*), Waterfall Gully. Europe. October.

[*Photo. by S. Tee.*

Figure 76.—Sclerotium of *Lentinus dactyloides* Clel. (No. 581). Buried and attached to railway sleepers. Under favourable conditions the fruiting body with pileus and stem will develop from some part of the upper portion. The finger-like processes point downward. Halidon, on Alawoona line. Reduced to ½.

LENTINUS (Page 170).

581. **Lentinus dactyloides** Clel. (Gr., *dactyloides*, like a finger, in reference to the sclerotium)—Pileus 1½in. (3.7 cm.), convex, flattened or slightly depressed in the centre, edge inturned, covered with a fine matted tomentum, smooth when this is removed, cuticle thick, near Avellaneous (XL.). Gills adnate tending to secede, close, slightly undulate (probably not fully expanded), edges thin, entire, 2 mm. deep, cream-coloured. Stem 1¾in. (4.3 cm.), ⅜in. (1.5 cm.) thick in centre, ½in. (1.2 cm.) below the gills, attenuated downwards below the centre to be attached to the finger-like sclerotia, covered with a dense spongy tomentum, near Vinaceous Buff (XL.). Flesh white, tough, attenuated outwards in the pileus, 3 mm. thick internally, rather fibrous in the stem. Sclerotia large, up to 7 x 7in. (17.5 x 17.5 cm.), irregular, in general like a dependent hand with finger-like processes directed downwards, the fruiting body arising from some portion of the upper convex "back of the hand," with a dark fuscous sand-encrusted cuticle

surrounding the greyish white granular sclerotium itself. Spores elongated, oblique, slightly curved, white, 9 to 13 x 5.5 to 7 μ. South Australia—Halidon (Alawoona line). May. (Figures 76 and 77.)

The mycelium penetrates and disintegrates the wood of the karri (*Eucalyptus diversicolor* F. v. M.) sleepers forming the substratum, and then appears on the surface as pallid branching often flattened cords, at first adpressed to the wood, but then becoming free with a stem-like attachment a few millemetres thick and downward-growing rounded or flattened branches, which gradually enlarge and thicken and when old become covered with the dark cuticle and converted into the mature sclerotia, which are found in close proximity to the sleepers and remain at first attached but finally separate as the substratum becomes exhausted.

[*Photo. by S. Tee.*

Figure 77.—Sclerotium of *Lentinus dactyloides* Clel. (No. 581), showing the whitish growing tips of the downward-directed processes. Halidon, on Alawoona line. Reduced to $\frac{1}{2}$.

This fungus is of considerable economic importance on account of the shortened life of the affected sleepers, which seem to be chiefly if not entirely karri ones. It is not known whether the fungus is an imported one, having originally entered the wood before it left the Western Australian forests, or whether it occurs naturally on other wood in the neighbourhood. The fruiting bodies have only been found once. Previous to this, the sclerotia were believed to belong to a polypore. *Lentinus tigrinus* (Bull.) Fr. and *L. lepideus* Fr. are recorded as attacking railway sleepers in other parts of the world, but neither of these species possess sclerotia.

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